February 17, 1958

Paper Trade Journal

Many Innovations at Canadian Meeting — Two brand new pulping processes and modifications of others were highlights. Interesting new thinking on behavior of fluids at paper machine wet end were revealed. Top level panel on research planning.

First Details of Sonoco NSSC Mill

New White-Water Shower Described

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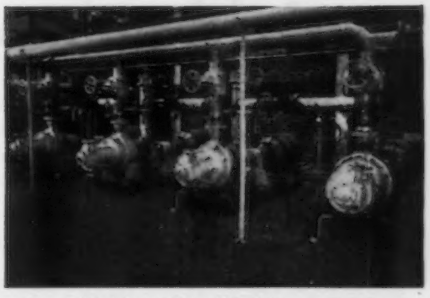

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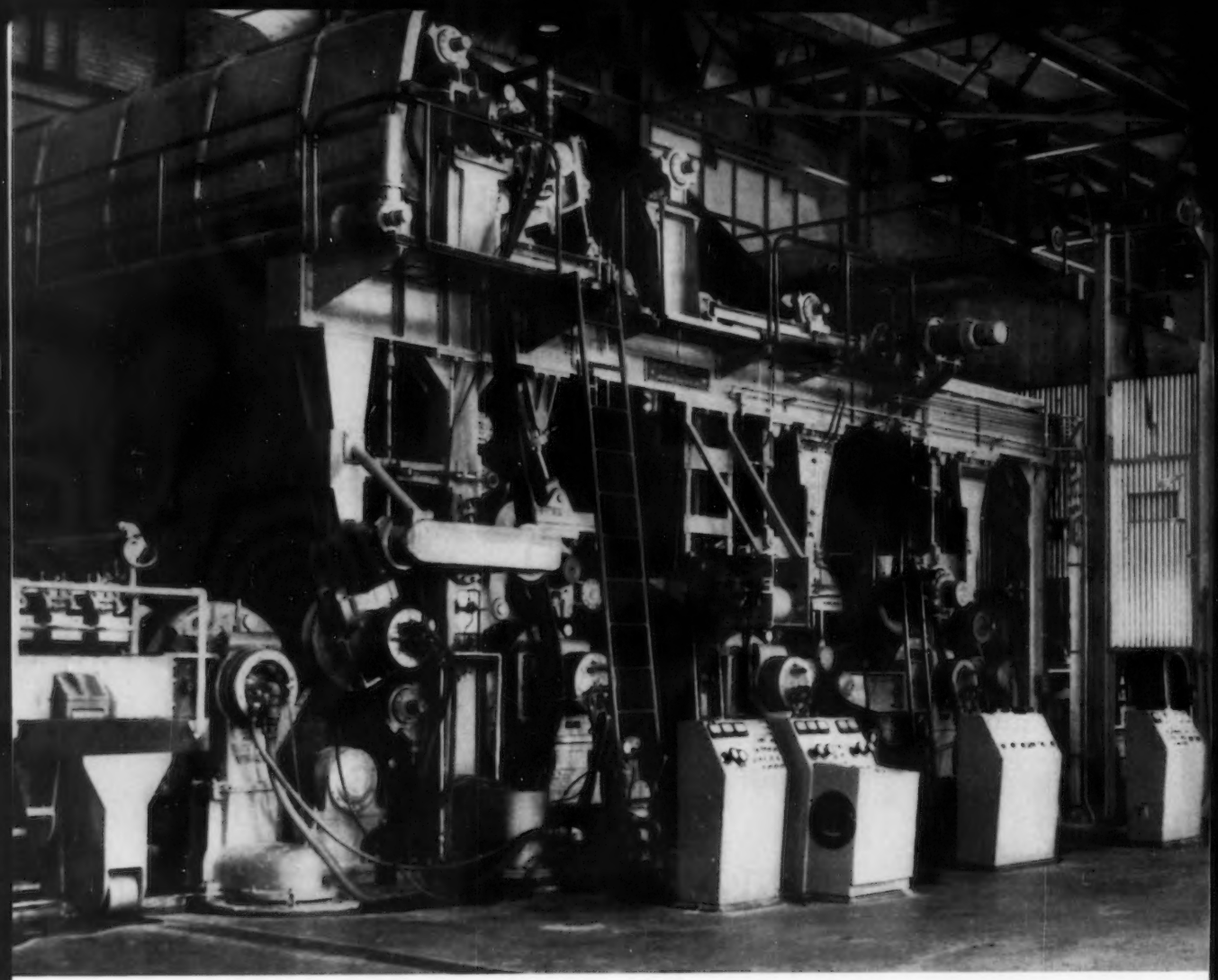

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PAPER TRADE JOURNAL

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February 17, 1958, *Vol. 142, No. 7*

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REMEMBER THESE DATES . . .

May 14-16: TAPPI Coating Conference, Bedford Springs Hotel, Bedford Springs, Pa.

June 2-4: Technical Section, CPPA, Summer Meeting, Chateau Frontenac, Quebec City.

June 3-5: Superintendents' Assn. Annual Meetings, Statler Hotel, Boston, Mass.

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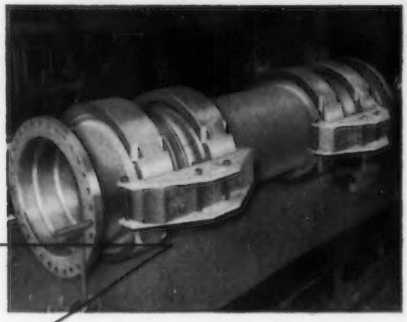

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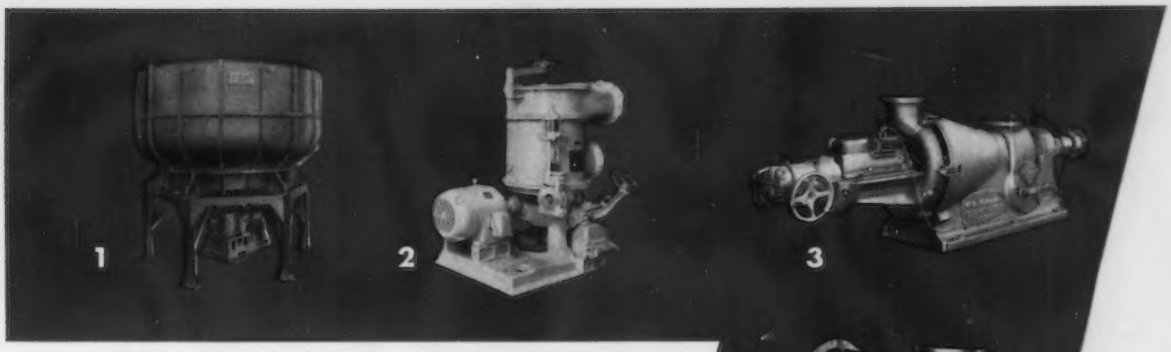

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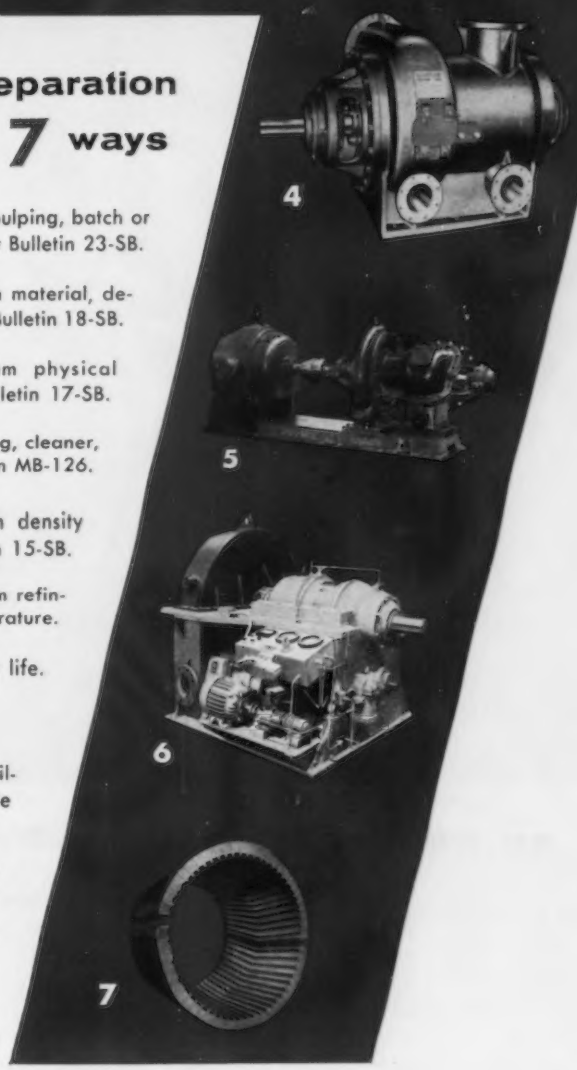

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Business Outlook—Prophets Cheerful

In the midst of our present recession there are few pessimists among the prophesying economists. Most still are predicting an upturn in the fall, a few say even earlier. We have seen only one prediction that we will have to wait until 1959 for the upswing.

More Developments in Pulp Manufacture

Greatest area for new developments has been pulp manufacture as compared with paper or board production. In recent years we have reported on radically new methods for groundwood production from both softwood and hardwood chips, the Chemigroundwood process and various new methods for drying and baling pulp—including the shipping of pulp in form of crumbs from screw presses by truck and ocean-going tanker. In the current issue we report on the commercial development in Canada of two new chemical pulping processes and research on another new approach to groundwood manufacture. In contrast we can think of only one important new development in the field of paper and board manufacture (including stock preparation, etc.) during the same period of time. This is the new approach to cylinder forming machines as typified by the Stevens former and Rotoformer.

Pulp Consumption and Inventories

Consumption of paper grades of market pulp in 1957 was 7% below the 1956 tonnage. In contrast, inventories of market pulp at paper and board mills at the end of 1957 were 19% below those at the end of the previous year.

Paper & Board Capacity to Up 5% in '58

Paper and board productive capacity in 1957 was increased by 6% over 1956 and capacity will be increased by another 5% in 1958. If the tonnage of paper and board produced this year were exactly the same as last year then the average rate of operations for our mills would be 85%. These are some of the findings of a capacity survey just completed by the Writing Paper Manufacturers Assn.

Cup & Plate Sales to Rise

Sales of paper cups and plates will reach new highs this year, forecasts C. L. Van Schaick, vice president of American Can Co. and executive head of its Dixie Cup Division. "Industry sales of cups in 1958 should show a substantial increase if present trends continue," he said.

Fine and Printing Papers in 1957

Fine paper production in 1957 was 3% less than in 1956 but 6% higher than in 1955. Printing paper output in 1957 was down 6% from 1956. Uncoated printing papers were off 12% while coated papers were 3% higher.

A FEW INTERESTING OBSERVATIONS CONCERNING OYSTERS, PEARLS AND ALBERTA HI-BRITE BLEACHED KRAFT PULP (MOSTLY ALBERTA HI-BRITE BLEACHED KRAFT PULP)

An oyster would be as dull as a clam if it weren't for a vital ingredient—nacre. Secreted by the oyster to surround any sea matter that enters its shell, this beautiful and miraculous substance forms into what we call a pearl. Its weight and shape determine its value. In very much the same manner, Alberta Hi-Brite, when added to your furnish, is the vital ingredient that determines the characteristics of excellence you desire.

Alberta Hi-Brite is the one bleached kraft pulp that gives your paper extra-high folding and tensile strength . . . plus formation and printability, qualities usually associated only with low-strength pulps. It lends opacity and cleanliness . . . makes your pulp white enough, bright enough for producing even the finest writing papers, thanks to a new *exclusive* multi-stage chlorine dioxide bleaching process. And, Alberta Hi-Brite has the unique ability to develop good characteristics *whether your product calls for light or extensive refining.*

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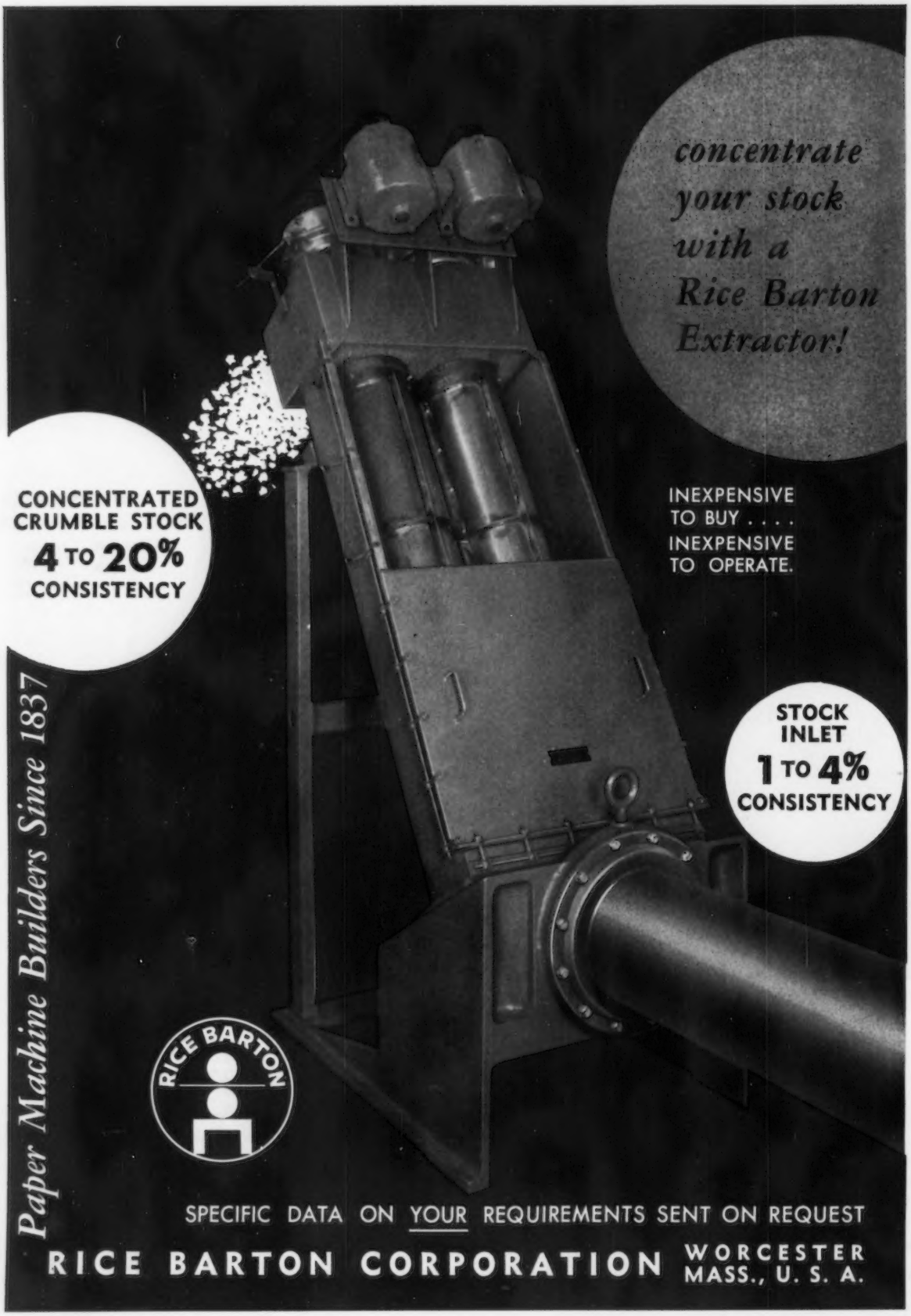
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Crofton Kraft Mill Now in Operation

All units of B. C. Forest Products' new kraft pulp mill have been checked out and the mill is now making fully bleached pulp on a 3-shift basis. First shipments of start-up pulp were made during the week of February 3.

Bowaters Hardboard Plant at Catawba

Bowaters Southern Paper Corp. has announced plans for a new hardboard mill at Catawba, S. C.

The process, officials said, will open a market for low quality hardwood trees which they said are overabundant in the Southeast.

The board mill plant, to be called Bowaters Board Co., will adjoin the pulp mill now being erected at Catawba by Bowaters Carolina Corp.

Capacity of the hardboard mill will be 500,000 sq. ft. a day on a one-eighth inch thick basis.

John G. Robinson, formerly associated with an Oregon hardboard manufacturer, has been named superintendent of the Catawba plant.

It had been previously understood that the hardboard plant would be at Bowaters' Calhoun, Tenn. mill site.

Allied Starts Improvement Program

A $400,000 program designed to increase the efficiency of its mills has been started by Allied Paper Co.

The company plans to equip each of nine paper machines with floatation type save-alls. The program is scheduled for completion by July 1, 1958.

The first three units will be in operation by April 1 in Mill D of the Bryant Mills, Kalamazoo, with two units in Mill C to be completed a month later.

The four machines at the King Division, Kalamazoo, Mich., will be ready for use in May and June.

Beckett Presidency Changes

At a meeting of the stockholders held in the offices of the Beckett Paper Co., Hamilton, Ohio recently, two new directors were elected. They are Walter A. Rentschler and Frederick A. Reister, both of Hamilton.

Mr. Rentschler is president of the Citizens Savings Bank and Trust Co. and vice president of the Baldwin-Lima-Hamilton Corp. Mr. Reister is a senior partner of the law firm of Millikin, Reister and Fitton, and a director of the Second National Bank of Hamilton. Other directors are Brandon R. Millikin, Guy H. Beckett, William Beckett, Valentine Friedrich, Jr., Robert K. Stevenson, Marshall L. Barker, and Don W. Fitton.

The board of directors elected the following officers: Brandon R. Millikin, honorary chairman; Guy H. Beckett, chairman; William Beckett, president; Valentine Friedrich, Jr., vice president; Robert K. Stevenson, treasurer.

Mead Orders Experimental Machine Wet End

First components of an experimental paper machine are on order for Mead Research Laboratories. A building to house the machine will go into construction next week. The experimental machine room will be an extension of the Research pilot plant in Chillicothe, Ohio.

Beloit Iron Works is building the wet end—head box and fourdrinier section —for the experimental machine. The building will have space for the later addition of a press section. When a dry end is wanted for the machine, the building will have to be extended southward.

The fourdrinier section and head box will measure 53 feet in length, and will take a wire 42 inches wide by 95 feet long. Width of the slice will be 36 inches. The machine is designed to reach higher speeds than any we are now operating at.

Purpose of the machine is to make fundamental studies in the paper making process, including such problems as formation at high speed, effective head box operation, drainage characteristics of fourdrinier components, etc. Scientific understanding of paper making fundamentals will aid Mead's program of producing papers of constantly higher quality at reasonable cost.

The head box will be adjustable, to permit studies of varying operating conditions. It will be possible to use either a pressure or vacuum head. The paper formed on the experimental fourdrinier can be carried from the couch roll to a pulper, for repulping and passing again through the stock system. At maximum speed, the stock system will be able to furnish stock for about 45 minutes to an hour's run. Either wet lap or dry pulp will be furnished to the machine.

Paper and Board Production

According to the American Paper and Pulp Assn., the ratio of the United States production to mill capacity for the week ending February 1, 1958, was 83.9 per cent compared with 89.1 per cent revised for the preceding week. The ratio was 96.5 per cent for the corresponding week a year ago.

The paperboard production ratio for the week ending February 1, 1958, was 82 per cent compared with 87 per cent for the preceding week and 94 per cent for the corresponding week last year.

(Detailed statistics on page 58.)

New Pulp Laboratory of University of California

The Forest Products Laboratory of the University of California is adding a new section this year, in woodpulp and pulp products research, at Richmond, Calif. Heading this new section will be Davis L. Brink, who transferred from the Central Research Department of Weyerhaeuser Timber Co. at Longview, Wash. to become a lecturer in forestry and associate forest products chemist wtih the University.

The new section will: 1) determine the pulping characteristics of many California forest species, both hardwoods and softwoods; 2) develop or modify pulping processes in order to reduce water requirements; and 3) reduce or eliminate stream pollution from pulp mill effluent.

Wet End of Pulp Machine at . . .

. . . the new 200-ton mill of Thurso Pulp & Paper Co., at Thurso, Que., which is near completion. The mill is jointly owned by the Singer Mfg. Co. and Perkins-Goodwin Co. It is designed to produce kraft pulp with a high brightness from soft and hard woods.

Paper Bag Institute's George S. Runyan (left) and Sydney K. Bradley (right).

Bradley Elected President of Paper Bag Institute

Sydney K. Bradley was elected president of Paper Bag Institute Inc. at the annual meeting January 28 in Belleair, Fla. Mr. Bradley is vice president of Union Bag-Camp Paper Corp.

Mr. Bradley succeeds William M. Allin, vice president of containerboard and kraft paper division of Continental Can Co.

George S. Runyan, vice president of Crown Zellerbach Corp., was elected vice president of the Institute to succeed Mr. Bradley.

Elected as members of the executive committee were: Marx Eisenman, American Paper Co.; D. P. Stout, containerboard and kraft paper division, Continental Can Co. Inc.; G. A. Weisberger, Equitable Paper Bag Co.; A. W. Aron, Hudson Pulp and Paper Corp.; F. John, International Paper Co.; William R. Kohl Sr., Lincoln Bag Co.; C. G. McGehee, Southern Maid Paper Co.; E. A. Jacobs, Triangle Paper Bag Mfg. Co.; C. H. Kimball, Waltham Bag and Paper Co.

Riegel Announces New Coating Facilities

Riegel Paper Corp. has announced that new coating facilities now make possible the economical application of solvent and agueous coatings to paperboard stock up to 25 pt. thickness. Previously, such coatings were available only on lighter weight papers.

According to Riegel, a number of these new coated boards are already in use including heatseal mounts for phototransparencies, jar closure liners, protective surfacing for decorative cover stocks, and for plastic film casting. The coatings are available to provide heatseal or release from tacky material, as well as resistance to moisture-vapor, grease, abrasion, soil or dirt.

Brown to Sell Birch Bark

Utilization for commercial purposes of "everything but the shade" from trees cut in New England forests came a step closer to fact when Brown Co. announced first shipments of specially-processed bark to be sold as a material for growing orchids.

Processing of yellow birch bark for orchid growing is the first step in a program underway at Brown Co. to use to the fullest extent bark from thousands of trees cut each year in Maine, New Hampshire and Vermont, according to an announcement by President A. E. H. Fair. Experiments have also shown that bark from northern New England trees is an excellent supplement to peat moss as a soil mulch, as a top dressing for lawns, and as an organic material to be mixed with the soil in growing plants and shrubs.

Vaculite Corp. Names Officers

New officers of Vaculite Corp., plastic and paper vacuum metalizing firm, are Henry W. Rigby, president; Maynard D. Conklin, treasurer, and Frederick H. Greene, Jr., vice president and general manager. Richard M. Nichols is secretary and clerk and David D. Nickerson is assistant treasurer. Allan R. Dragone continues as assistant general manager and sales manager.

Vaculite Corp. is jointly owned by National Research Corp., Cambridge, Mass. and Champion Paper and Fibre Co., Hamilton, Ohio. Sales and production facilities are located at 70 Memorial Drive in Cambridge. Vaculite will soon initiate the large scale commercial production of metalized paper for packaging, building insulation and other applications, with shipments expected to start in mid-1958.

PAPER PEOPLE

C. L. Dostal

Clarence F. Watson

Elected Thilmany VP

C. L. Dostal was elected vice president of manufacturing of Thilmany Pulp & Paper Co. by the board of directors following the annual stockholders meeting February 6. He succeeds C. R. Seaborne who remains executive vice president of the firm.

Mr. Dostal has been a director of Thilmany since 1955, and was general sales manager prior to his most recent position of assistant to the executive vice president.

Scott Announces H & W Promotions

Hollingsworth & Whitney Division of Scott Paper Co. at Mobile, Ala. has announced the following promotions:

John A. Shaler was appointed to assistant paper mill superintendent. He has 32 years of papermaking experience with Scott, having joined the firm at the Chester plant in 1925.

Leo B. Newberry, presently shift engineer, was promoted to assistant manager of utilities. He joined Scott in 1941.

H. T. Shaw, head fireman, and James O. Locke Jr., turbine operator, have been promoted to shift engineers. Mr. Shaw joined Scott at Mobile in 1940, and Mr. Locke in 1946.

New Great Lakes Traffic Manager

Albert V. Fildes has been appointed traffic manager by Great Lakes Paper Co. Ltd., Fort William, Ontario, to succeed the late Charles D. Harrison.

Nekoosa Engineer Retires

Clarence F. Watson, former engineering department manager, retired February 1 after 38 years with Nekoosa-Edwards Paper Co.

He joined Nekoosa-Edwards in 1920. In 1933 he was named mill engineer and four years later was placed in charge of the engineering department when the power operations were established as a separate division. He held the position of engineering manager until January 1956 and has remained with the department since then in a staff capacity.

Mr. Watson says the "most satisfying" project of his engineering career was the building of Nepco Lake, begun in 1925 to provide pure process water for paper-making. In 1927 he wrote a thesis on the lake program to earn his civil engineer's degree.

Mr. Watson has played an active role in the major mill expansion projects over the years, including construction of the Nekoosa kraft mill in 1927, several extensive finishing and shipping additions at both Wisconsin mills, and complete rebuilding of several paper machines. A challenging project he recalls is building a continuous stage bleach plant at the Nekoosa mill in 1947, since it was "entirely different from anything done before by the engineering department."

Franconia Elects Somers President

Franconia Paper Corp. announces that M. Suphen Somers has been elected president of the firm.

Gouker Made Supt. of New Sitka Mill

George L. Gouker has been appointed general superintendent of Alaska Lumber & Pulp Co. Inc. He will be in charge of the operating departments for a pulp mill being built at Sitka, Alaska. He had been with Rayonier Inc. since 1937, most recently as assistant superintendent at Fernandina Beach, Fla.

Kohnen Retires at Wisconsin Rapids

Paul H. Kohnen, 65, paper machine tour foreman at Wisconsin Rapids Division of Consolidated Water Power & Paper Co., retired January 31 after over 43 years of employment. Mr. Kohnen joined the company in 1914 at Wisconsin Rapids Division as a paper machine back tender. He was appointed a machine tender in 1923 and in 1955 became a tour foreman.

Joseph A. Horock will succeed Mr. Kohnen as a paper machine tour foreman. Mr. Horock began his employment with the company in 1914 and has worked on paper machines at Wisconsin Rapids and Biron Division. He has been a paper machine tender since 1932.

Marinette Promotes Gibbs

Marinette Paper Co. has promoted F. James Gibbs to the position of pulp mills engineer. Mr. Gibbs was hired by Scott Paper Company in 1954 as an engineering trainee after his graduation from the University of Delaware.

Wins C. of C. Award

William H. Warren, left, personnel manager of Halifax Paper Co., is awarded the Roanoke Rapids, N. C. Junior Chamber of Commerce distinguished service award of 1957. Fred L. Cooper Jr. (right), winner of the 1956 award.

Convention Report

on machinery and equipment for the making of better pulp and paper and more of it per day at lower cost per ton

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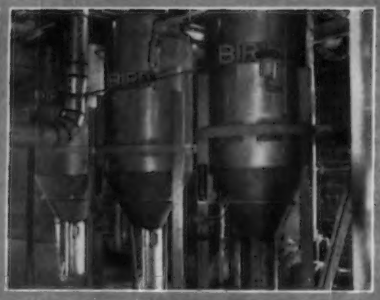
For cutting cost of lime recovery kiln operation



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BIRD JONSSON SCREENS

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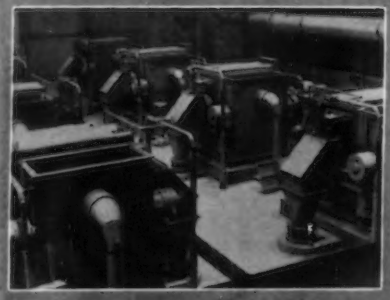
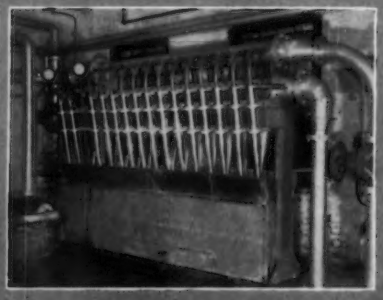


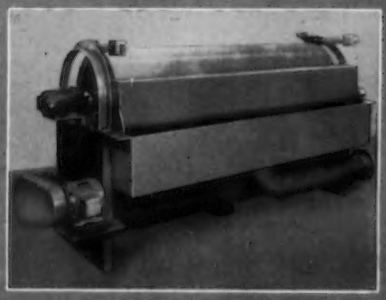
BIRD VIBROTOR SCREENS

For high consistency, high capacity slotted plate screening



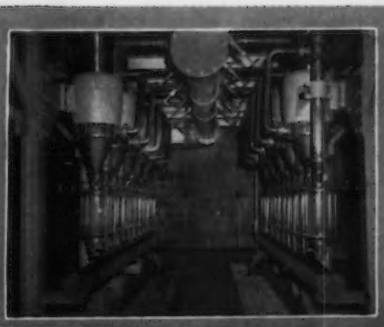
BIRD CYCLEANS

For low cost removal of shives and fine dirt from pulp



BIRD PRESSURE EXTRACTORS

For continuous, effective removal of tacky and tarlike dirt



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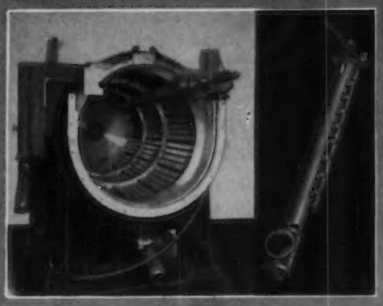
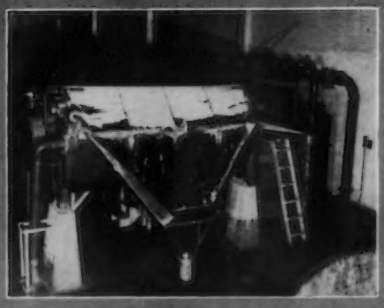


BIRD OSCILLATING SHOWER PIPES

For continuously efficient, economical showers



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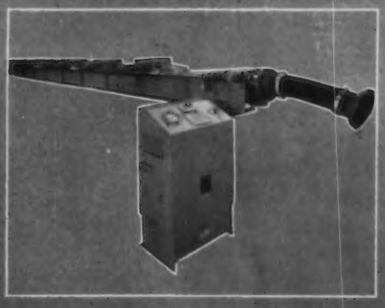
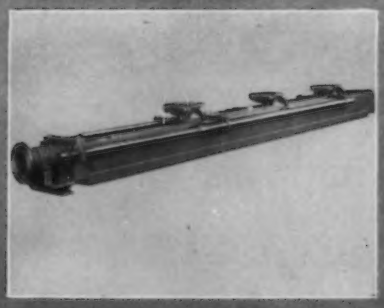


VICKERY FELT CONDITIONERS

For saving money by avoiding paper machine shutdowns or slowdowns



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For increasing cylinder machine operating efficiency and economy

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For maintenance of constantly clean, smooth roll surfaces

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Fellows Named St. Lawrence Exec.

Carl M. Fellows, senior vice president of Fitchburg Paper Co., has accepted vice president of the St. Lawrence Corp., Ltd., of Canada and will assume his new duties there on April 1.

Mr. Fellows will be located at the main office of the corporation in the Sun Life Building, Montreal, Canada.

Tauhert Goes to Allied

Allied Paper Corp. has appointed Ramsay Tauhert, formerly with Standard Paper Manufacturing Co., to its New York City sales staff.

New St. L. Superintendent

St. Lawrence Paper Corp., Norfolk, N. Y. has appointed Walter W. Hampton as paper mill superintendent.

Syracuse Adds To Research Staff

Dr. Hardy L. Shirley, dean of the State University College of Forestry at Syracuse University, has announced two new appointments to the Research Staff in Pulp and Paper Technology, Dr. Philip Luner and Dr. Renata G. Marton.

Dr. Philip Luner comes to the college from the Sulphite Pulp Manufacturers' Research League, Appleton, Wis. He was physical chemist and group leader there from 1954 until now. Prior to that, he was research chemist for three years with the Pulp and Paper Research Institute of Canada, Montreal.

At the State University College of Forestry at Syracuse University, Dr. Luner will undertake physical chemical studies basic to the chemistry of pulping and pulp purification. He will be working with the research team that is jointly sponsored by the college and the Empire State Paper Research Associates, Inc. (ESPRA).

Dr. Renata G. Marton from 1950 to 1957 was head of the Division of Cellulose of the Paper Research Institute, Budapest, Hungary. While at the Hungarian Paper Institute, Dr. Marton directed basic studies on the chemistry and technology of pulping and pulp purification. Her work is described in numerous publications and in many confidential reports to the Institute.

Early in January 1957, Dr. Marton fled from Hungary and, for a period of six months, was research chemist at the University of Vienna (Austria). She worked with Professor Dr. K. Kratz.

At the State University College of Forestry at Syracuse University, she will undertake organic chemistry and physical organic studies basic to the chemistry of pulping and pulp purification.

Consolidated Announces Promotions

Consolidated Water Power & Paper Co. has announced promotion of two men at Wisconsin Rapids.

Robert J. Weinbauer has been appointed assistant to the director, book paper manufacture. He joined the company in 1937, serving in various capacities in the central laboratory before becoming quality control clerk for the Wisconsin Rapids Division manager in 1950.

Charles Stolp Jr. has been named an assistant to the production manager, Biron Division. He has been a clerk in the Biron Division production office since 1945 with the exception of two years spent in military service.

Robert Van Hagen

G. W. Bowles

L. L. Klinger

T. Fred Gorgenson

New Assignments at Central States Engineering

Central States Engineering has announced promotions and re-assignments of the following personnel: Robert L. Van Hagen, chief engineer; G. W. Bowles, staff electrical engineer; L. L. Klinger, staff process engineer; T. Fred Gorgenson, staff structural engineer.

Central States Engineering Inc., is celebrating its twelfth year as a consulting firm. It has grown steadily and now is comprised of a technical staff of five and an engineering department of 19. Operations include Europe and Latin America as well as the U. S.

CZ Announces Staff Changes

Crown Zellerbach announces to the following staff changes:

William P. Morgan, assistant to multiwall and grocery bag superintendent, Port Townsend, to assistant multiwall and grocery bag superintendent, Port Townsend.

C. O. Knight, sales service manager, Gaylord Memphis office, to manager, Gaylord Memphis sales office.

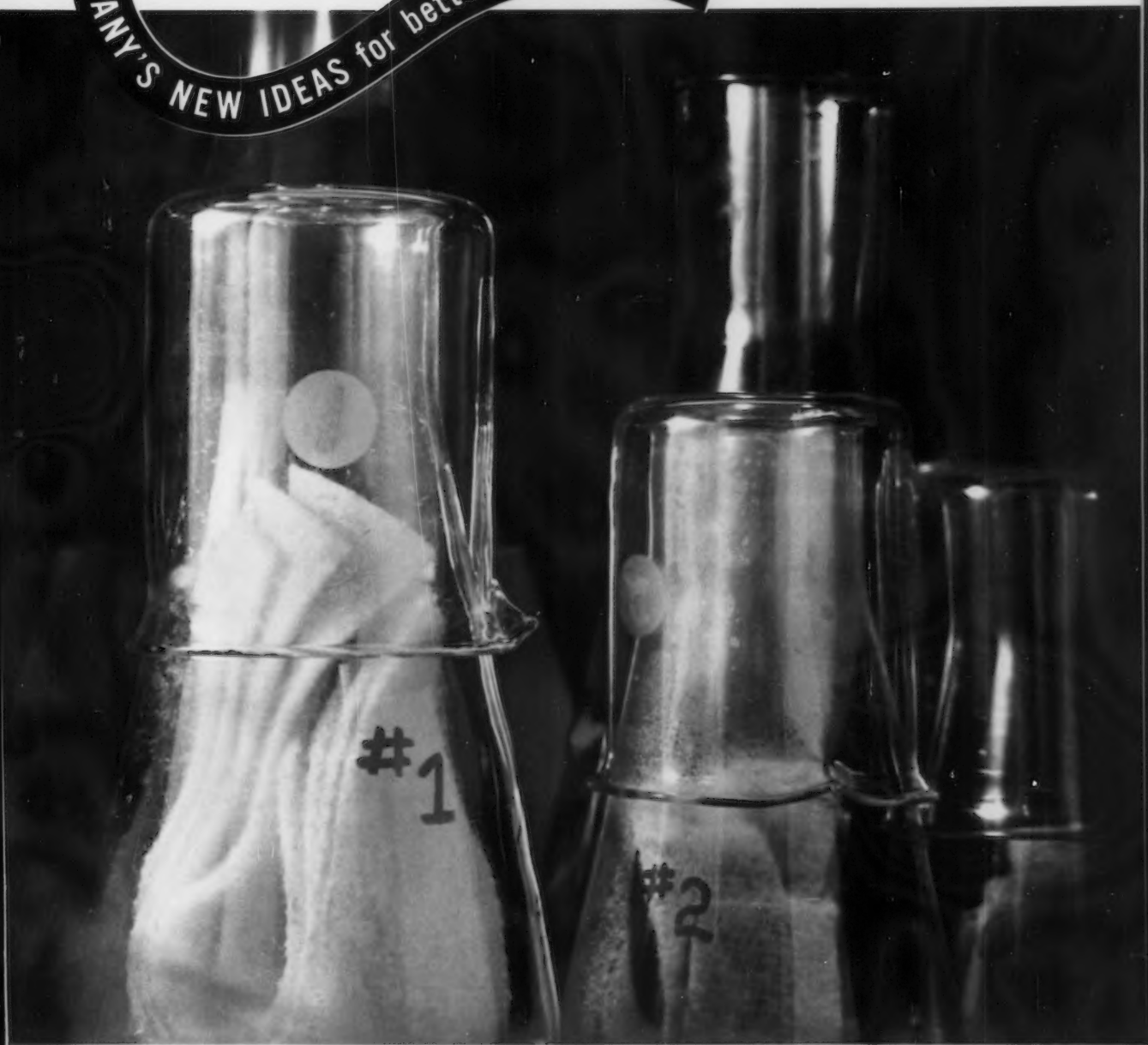
John P. Gram, assistant master mechanic, Lebanon, to master mechanic, Lebanon.

Clarence E. Englund, technical assistant, steam and power, Lebanon, to steam plant superintendent, St. Helens.

Orville W. Campbell, electrical engineer, St. Helens, to assistant electrical supervisor, St. Helens.

Edward L. Wetsig, assistant converting maintenance supervisor, Carthage, to conventering maintenance supervisor, Carthage.

ALBANY'S NEW IDEAS for better papermaking



View through window of laboratory oven shows used felt samples being incubated under simulated mill conditions to determine bacterial growth and damage.

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1307

Two New Chemical Pulping Processes Announced at Canadian Meeting

John C. W. Evans
Editor, Paper Trade Journal

Outstanding highlights of the 44th annual meeting of the Technical Section of the Canadian Pulp and Paper Assn. held in Montreal the last three days of January were: announcement of two new proven pulping processes; two sessions on the fluid dynamics of the fourdrinier wet end; and a most unusual panel discussion on research departments and their relationship with other phases of company operation.

At annual business meeting of the Technical Section held on the opening morning, Dr. R. D. Duncan, assistant mill manager, Canadian International Paper Ltd., Three Rivers, Que., was elected chairman. Dr. Duncan succeeds J. W. Wing, general manager, Dryden Paper Co. Ltd., Dryden, Ont. Elected vice chairman of the section was J. McK. Limerick, research director, Bathurst Power & Paper Co., Montreal. Elected to the Technical Section Council for three-year terms were: W. D. Mosher, manager Belgo Division, Consolidated Paper Corp., Shawinigan Falls, Que.; R. H. R. Young, executive vice president, Crown Zellerbach Ltd., Vancouver, B. C.; and D. P. Best, vice president, KVP Co., Espanola, Ont.

Chairman elect R. D. Duncan, Douglas Jones, executive secretary, and J. W. Wing, retiring chairman.

New Pulping Ideas

Abitibi Power & Paper Co. revealed the first extensive details of their high yield (or semichemical) sulphite pulping process named Arbiso. Howard Smith Paper Mills unveiled their new Magnefite sulphite process. Both processes are based on using cooking acids with no free SO_2, i.e. all is combined in the former with sodium and the later with magnesium. Both papers, which report mill scale operations, are summarized in detail later. The Pulp & Paper Research Institute of Canada reported on successful investigations of the refining of course groundwood with disk refiners. A summary of this paper is also presented.

Research Dept. Relationships

One of the most interesting features of the meeting was a panel discussion on the inter-relationships of research with manufacturing, sales and management. The panel moderator was Dr. W. Gallay, director of research, E. B. Eddy Co. Panel members were D. W. Ambridge, president, Abitibi Paper & Power Ltd.; A. C. Hill, executive vice president, Anglo Paper Products Ltd.; D. E. Read, executive vice president, Industrial Cellulose Research Ltd., and C. A. Sankey, research director, Ontario Paper Co.

Highlight of the panel was the extremely high level of presentation by all speakers. Mr. Ambridge made the following points: The research director, or the man to whom he reports, must be a vice president with power and not in name only. He discussed the difficulty of assessing the value of research work. He also referred to the patent phobia, maintaining that there was a disinclination for Canadian pulp and paper companies to patent the results of their research work but to make information freely available. He said that this was admirable when there was less specialized information available, but that today the position is different. There is no point in making all of your hard-earned information available to your competitors without protection and that patents are the only protection. He pointed out that patents not only are a protection against infringement by the competitors but also partly cover against infringing competitive patent protection which might prevent using one's own prior research work.

Mr. Read stressed the point that a research department must not be forced into fire-fighting types of diversionary effort which should be handled by mill technical staffs. He also spoke of the need for adequate communications between the research department and the various management groups. That research department should be used to train company staff was a startling statement put forth by this speaker. He also discussed the problems of proper liaison

with production departments when making full scale test runs.

Dr. Hill dealt with the functions of the sales department of a paper company in cooperation with the research department. He pointed out that there was not nearly sufficient cooperation and communication between these two departments. Lack of sufficient appreciation for the research department on behalf of sales is prevalent in almost every company. Generally speaking, the efforts of the research group in enlarging sales by improvement of existing lines or development of new products is unappreciated in the sales department, excepting possibly at the topmost level.

Dr. Sankey raised the point of adequate payment for the scientists, and stated that this should be at the same rate as for production men. This is not the general practice in the Canadian industry. He defined the duties and rights of the research department and said research men have the right to be wrong once in a while. He strongly disagreed with Mr. Read with regard to using the research department as a training school for the general staff.

The editor was much impressed with the general philosophy put forward, however from his wide personal observation he seriously questions to what extent these principles are practiced by our North American companies.

Fourdrinier Fluid Dynamics

Recently the Technical Section has been devoting considerable attention to the hydrodynamics of the wet end and the recent annual meeting was no exception, when two sessions of papers were presented. The efforts of this organization in this neglected fundamental field of paper machine operation are most admirable. The highlight of this portion of the program was the presentation of a paper by Sir Geoffrey Taylor of Cambridge University. At the 1956 Canadian meeting Sir Geoffrey presented a paper on the water removal from the stock on the wire by the fourdrinier table rolls. He said that in preparing this theoretical paper he had not considered mixing of adjacent parts. He also reported that where there was complete mixture of adjacent portions below the wire that this would give a different answer. He could not then present this different treatment because he did not have the necessary equations.

The paper presented this year gave complete consideration to the case of "complete mixing." The important point in this second paper is that while the maximum suction provided by the table rolls is only moderately higher than in the original consideration, the total quantity of water drained is double that predicted in 1956.

Members of panel discussion on research, manufacturing, sales and management: Dr. C. A. Sankey, Dr. A. C. Hill, D. E. Read, Dr. W. Gallay, D. W. Ambridge, and Dr. A. H. Vroom of Consolidated Paper Corp.

In another aspect of hydrodynamics, several papers were presented on the fluid dynamics of wet end accessories and piping. J. Mardon, P. B. Wahlstrom and G. O'Blenes, Anglo Paper Products Ltd., discussed the occurrence of pressure pulsations in the approach piping of paper-machine headboxes is more widespread than generally realized. These pulsations, which can affect open and air-cushioned boxes, as well as closed boxes without air cushion, show on the wire as length-direction, basis-weight variations.

Methods of measuring and characterizing the pressure fluctuations are presented, and the results obtained on four typical systems including all three types of headbox are discussed. The reasons for the pressure variations recorded are advanced. A new method of analyzing length-direction betameter charts, involving Fourier anaylsis with the analogue computer, is presented, and the results of such analyses are related to the pressure measurements.

Methods of dealing with the surges and elastic pressure waves, which are the cause of the recorded pressure variations, are listed, together with an outline of some of the results obtained.

A paper on a practical problem on this subject was presented by N. M. Reitzel, Rice Barton Corp. Because of its practical implications this paper is summarized later.

G. H. Tomlinson II
announced new pulping process.

Both the discussions of wire drainage and wet end flow accessories and piping open new fields of thought in paper making and explanations for previously not understood difficulties. The Technical Section is continuing its excellent work in this direction by sponsoring a summary of the inter relationships of all papers published in this field. This is a major project because of the different symbols, nomenclature and method of approach used in the different papers.

Papers Presented

Research Department Philosophy

Moderator—Dr. W. Gallay, E. B. Eddy Co.

Panel discussion of the inter-relation of research with manufacturing, sales and management: D. W. Ambridge, president, Abitibi Power & Paper Co.; Dr. A. C. Hill, executive vice president, Anglo Paper Products; D. E. Read, executive vice president, Industrial Cellulose Research; Dr. C. A. Sankey, research director, Ontario Paper Co.

Technical Section Business Meeting

Chairman—J. W. Wing, general manager, Dryden Paper Company, and retiring chairman of the Section.

Alkaline Pulping

Chairman: D. M. Reid, Marathon Corp. of Canada.

The Relationship Between Pulp Quality and Alkali Concentration. C. B. Christiansen and C. W. Legg, Pulp and Paper Research Institute of Canada.

Control for Wood Weight and Moisture Variation for the Alkaline Pulping of Deciduous Woods. H. M. Banfill, J. G. Wheeler and J. M. Ferguson, Howard Smith Paper Mills Ltd.

Fine Paper Session

Chairman: E. W. Willcock, E. B. Eddy Co.

Fine Papers from the Viewpoint of the Paper Machine Builder. D. R. Simonds, Beloit Iron Works, Beloit.

Where Are We Going In Printing Press Design? R. P. Tyler, Harris-Seybold Co., Cleveland, Ohio.

What the Printer Wants and Expects From the Fine Paper Supplier. A. Beecroft, Rolph-Clark-Stone Ltd., Toronto.

Papermaking — Some Fundamentals. Harry Williamson, Paper and Paperboard Consultant, Englewood, N. J.

Fine Papers from the Papermaker's Viewpoint. S. J. Leishman, Provincial Paper Ltd., Thorold, Ontario.

Papermaking Session

Chairman: A. D. Hamilton, Quebec North Shore Paper Co.

Mixed Stock Control System at Mersey Paper Co. Ltd., H. A. Paterson and E. Hazeldine, Mersey Paper Co. Ltd., Liverpool, Nova Scotia.

Comparison of Twinver Air Bleed and Standard Pressing Installation at Great Northern. D. F. Pollard, Great Northern Paper Co., East Millinocket.

Wear of Fourdrinier Wire Bearing Materials. I. T. Pye, Quebec North Shore Paper Co., Baie Comeau, Quebec.

Fundamental Research

Chairman: Dr. A. H. Vroom, Consolidated Paper Corp., Grand Mere, Quebec.

Determination of Fiber Orientation in Paper. H. Ruck and H. A. Kraessig, Industrial Cellulose Research, Hawkesbury, Ontario.

Frictional Mechanisms in the Grinding Process. D. Atack and W. D. May, Pulp and Paper Research Institute of Canada.

Tosylchloroamide Degradation of of Pulp Materials. Characterization of Dissolving Pulps. Dr. T. N. Kleinert, and Rose-Marie Dlouhy, Pulp and Paper Research Institute of Canada.

Wet-End Hydrodynamics

Hydroynamic Behavior of Papermaking Fibers. D. R. Forgacs, A. A. Robertson and S. G. Mason, Pulp and Paper Research Institute of Canada.

Drainage at a Table Roll and a Foil. Sir Geoffrey Taylor, Cambridge University.

More Hydrodynamics

Chairman: Dr. K. C. Logan, Anglo Paper Products, Quebec City.

The Hydrodynamics of Paper Machine Headbox Approach Piping. J. Mardon, G. O'Blenes, and B. Wahlstrom, Anglo Paper Products, Quebec City.

J. McK. Limerick
New Vice Chairman

The Influence of a Simple Surge Tank on Pressure Oscillations in a Piping System. W. Douglas Baines, National Research Council, Ottawa.

An Investigation of Hydraulic Pressure Pulsations in Wet End Piping of a Paper Machine. Nicholas M. Reitzel, Rice Barton Corp.

Investigation of Wet End Flow Problems. A. R. Murphy and G. H. Webster, Industrial Cellulose Research.

Sulphite Mills

Chairman: A. W. Rowe, New Brunswick International Paper.

Survey of Current Sulphite Mill Instrumentation. A. L. Mills, Bowater's Newfoundland Pulp and Paper Ltd., Corner Brook, Newfoundland.

Automatic Control of Pulp Chlorination with an O.R.P. Meter. W. H. Bush, Gaspesia Sulphite Co. Ltd., Chandler, Quebec.

High Yield Sulphite Instrumentation. R. M. Stuart, Ste. Anne Paper Co., Beaupré, Quebec.

Wood Deterioration and its Effect on Pulp Quality and Yield. T. G. Sheridan, Howard Smith Paper Mills Ltd.

Groundwood

Refining Low Energy, High-Production Groundwood with a Double-Disk Refiner. W. H. de Montmorency, Pulp and Paper Research Institute of Canada.

Technical Section Dinner—Speaker: Dr. Hugh L. Keenleyside, Director General, United Nations Technical Assistance Administration. Topics: Canada's Place In Foreign Aid.

The F. G. Robinson Technical Section Service Award, was given for the most valuable contribution towards the furtherance of the aims of the Section in its technological work, to E. W. Willcock, E. B. Eddy Co., for his work as chairman of the Section's Fine Papers Committee over the last two years.

The C. Howard Smith Medal for the best paper submitted to the Technical Section in 1957 by a junior or student member was presented to I. T. Pye, Quebec North Shore Paper Co., by H. Roy Crabtree, chairman of the board, Howard Smith Paper Mills.

Stock Chests

Chairman: Dr. O. J. Walker, Anglo-Canadian Pulp and Paper Mills.

Determination of the Optimum Size and Efficiency of Stock Chests: The Ideal Chest. Dr. A. Cholette, Laval University, Quebec City, and Dr. O. J. Walker, Anglo-Canadian Pulp and Paper Mills.

Side-Entering Propeller Mixers in Vertical Cylindrical Stock Chests. Dr. J. Y. Oldshue and A. T. Gretton, Mixing Equipments Inc., Rochester, N. Y. Greey Mixing Equipment Ltd., Toronto.

Material Handling

Chairman: J. S. Forrester, Ontario Paper Co., Thorold, Ontario.

How Do You Plan the Handling System? J. W. Hall, Westinghouse Electric Corp., Newark, N. J.

How We Handle Paper in the Warehouse. W. E. Crotty, Time Inc., Chicago, Ill.

Paper Machine Vacuum Requirements

Chairman: G. M. Minard, Spruce Falls Power & Paper Co., Toronto.

Vacuum and Capacity Requirements of Paper Machines. F. W. Green and R. N. King, Nash Engineering Co.

A Machine Builder's Views on Vacuum Requirements of Paper Machines. M. Papesh, Beloit Iron Works.

Stress Analyses of Suction Roll Shells. Richard L. Elderkin, Consolidated Paper Corp., Grand Mere, Quebec.

Panel discussion of above paper. Chairman: R. V. Smith, E. B. Eddy Co. Panel members: G. C. Boone, Ontario Paper Co., Thorold, Ontario; E. T. Buchanan, Consolidated Paper Corp.; J. L. A. Corcoran, Anglo-Canadian Pulp and Paper Mills, Quebec City; and T. Foulkes, E. B. Eddy Co.

Three Pulping Developments

Chairman: F. W. Stocker, E. B. Eddy Co.

The Pulping of Mechanically Treated Wood. Dr. J. E. Stone and L. F. Nickerson, Pulp and Paper Research Institute of Canada.

Pulp Production with Sodium Bisulphite. The Cooking of Spruce. R. M. Dorland, R. A. Leask and J. W. McKinney, Abitibi Power and Paper Co., Sault Ste. Marie, Ontario.

The Magnefite Process—A New Pulping Method. G. H. Tomlinson, G. H. Tomlinson II, V. R. G. Bryce, and N. G. M. Tuck, Howard Smith Paper Mills, Cornwall, Ontario.

High Yield Pulp Production with Sodium Bisulphite

R. M. Dorland, R. A. Leask and J. W. McKinney
Central Research & Development Division
Abitibi Power & Paper Co. Ltd.

A new type of high-yield cook, called the Arbiso process, is based on the use of sodium bisulphite as the cooking agent, in the absence of any actual free SO_2.

Proper refining gives a bright pulp of exceptional strength, with a lignin content less than acid sulphite pulp at the same yield.

There is a completely flexible relation between time and temperature. Lignin tends to rise with temperature, but strength is not affected, and remains very high.

Mill trials confirm the good quality and high strength of these fibers.

There has been increased interest recently in pulping with bisulphite solutions, which must be differentiated from the normal "acid sulphite" cook as containing no uncombined sulphur dioxide. It is curious that such an interest did not develop earlier in the history of chemical pulping, as a natural corollary of the use of pulping liquors containing an excess of free sulphur dioxide. That is probably due to several causes. First, the base was the more expensive ingredient, therefore the objective was the least possible quantity of it and the cheapest element, which turned out to be calcium. Since calcium salts are insoluble in water, a large excess of sulphur dioxide was needed to avoid precipitation. Second, the cooking rate is slower as the acidity declines, making the process more desirable for semi-chemical pulps, therefore it had to wait for the development of an efficient machine for making pulp out of hard chips, the disk refiner.

The author's attention was centered on cooking with sodium bisulphite, and this paper describes the development of a new type of cook with spruce, which we call the Arbiso process.

Pulps prepared from both softwood and hardwood by the Arbiso process on the mill scale have been bleached in the paper mill and made into fine paper of various grades. No difficulty was experienced on the machine. However, particular attention was paid to pulp strength, and the trials were designed to show the superior strength which was indicated by laboratory tests. The high expectations for these fibers were fully confirmed: softwood Arbiso replaced kraft in mixed furnishes, while hardwood Arbiso replaced softwood sulphite without loss of quality in either case, and in more than one furnish. Estimates indicate that the added cost of the fiber over standard acid sulphite pulp is lowered by the greater utilization of hardwoods, and will not be excessive in view of the quality, but it is obvious that a really successful system for base recovery would make it even more attractive.

Summary

There are theoretical advantages for cooking with a sulphite liquor at about pH 4.5, where all the SO_2 is combined as the bisulphite, and in practice these are not only realized but produce a superior pulp. A soluble base is required; sodium is preferred to magnesium, while ammonia is even less suitable.

Penetration is slower at the higher pH, therefore some form of assisted penetration is needed for completely uniform cooking. But burning of the chips does not occur, and the temperature may be raised without restriction to get as fast a cook as may be desired. Lignin may be slightly higher at the same yield, but strength is not affected, even at 180° C. The cooking chemical required is from 16 to 20 per cent $NaHSO_3$, based on wood. Lignin removal is faster than in acid sulphite cooking, especially at higher yields.

Strength shows only minor changes as yield rises, but drops rapidly above 80 per cent yield. Refining tends to develop burst at the expense of tear, but at a moderate freeness level Arbiso pulps show unusually good tear. Beating shows that Arbiso pulps are considerably stronger than acid sulphite pulps and laboratory cooks are the equal of kraft; however, there is the usual drop in strength for commercial cooks.

Mill bleaching and paper machine trials confirm laboratory expectations of higher strength for both softwood and hardwood Arbiso pulps.

Refining Coarse Groundwood With a Double-Disk Refiner

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Pulp and Paper Research Institute of Canada

The proposal that a "coarse" groundwood might be refined to yield an acceptable mechanical pulp, perhaps at an overall saving in energy, has intrigued groundwood operators for some time, but little actual experimental work has been reported. The Bauer Bros. Co., in cooperation with a mill in the United States, made some experiments which led to a mill installation based upon the method described in the title of this paper. Wishing to obtain more comprehensive information than was available from these experiments, the Bauer Bros. Co. sponsored a project at the Pulp and Paper Research Institute of Canada which had as its goal a more detailed examination of the factors which might be involved in refining low-cost groundwood. The results of this investigation are reported in full in the paper.

An especially made, long, free groundwood was refined in a Bauer double-disk refiner under a variety of operating conditions to produce mechanical pulps possessing the attributes of commercial papermaking groundwoods. The special free groundwood was produced at a high rate and at a comparatively low energy-cost. The cumulative energy costs of the pulps made by grinding plus refining were of the same order as those for ordinary groundwoods of the same freeness.

When pulp strength, rather than freeness, was taken as the basis of comparison, the cumulative energy-costs were lower than those for grinding when refining was done at consistencies in the 2.5—5.0 per cent range, as it was found that strength development was more efficient at these consistencies than at high (8—12 per cent) consistencies.

The freeness of all the pulps made were directly dependent upon the refining-energy consumption and independ-

ent of the refining consistency and temperature. When double-pass, rather than single-pass, refining was employed it was possible to operate the refiner at wider plate settings for the same unit energy-input and the pulps so produced were freer than those of the same strength which were made in a single pass. Two plate types were investigated and it was found that type C906 was adapted to this type of work, and that type 3718A was not.

Magnefite Process – a New Pulping Method

G. H. Tomlinson, G. H. Tomlinson II, J. R. Bryce and N. G. M. Tuck

Howard Smith Paper Mills Ltd.

Magnesium-base recovery applied to the acid sulphite process has resulted in a major advance, but this process is not suitable for many woods. Further studies have led to the "magnefite" process which involves cooking with magnesium bisulphite solution without the normal excess of sulphur dioxide and using a higher combined sulphur dioxide concentration than that used for acid sulphite production. Use of such liquor allows shortened cooking schedules and simplifies processing.

Data presented showed that pulps superior to regular sulphite can be produced and that, by increasing the combined sulphur dioxide concentration, faster pulping, lower rejects, and greater pulp brightness may be obtained. By varying the cooking times superior pulps were produced over a wide range of yields. Examples of pulps produced from several softwoods and hardwoods were given.

Modification of the existing recovery system as part of the magnefite process was described and its advantages shown.

This investigation has led to the development of what is essentially a new cooking process but which still retains the remarkable simplicity and innate advantages of magnesia liquor recovery. This process, which is now referred to as the magnefite process involves the use of *magnesium bisulphite* for digestion and takes its name from the first two and final syllables of the names of this chemical. The cooking liquor differs from that used in the conventional sulphite process in that the liquor is essentially free of excess sulphurous acid, and therefore of excess SO_2 vapor pressure. Such liquors have a pH in the range of 3.5 to 5.0. The digestion can be carried out rapidly and at relatively high temperature and has been found to have many advantages over regular sulphite—even with species that are normally readily cooked by acid sulphite.

Elimination of Excess SO_2

The astonishing fact that it is neither necessary nor desirable to recycle the very large quantity of sulphur dioxide which has been considered essential to sulphite cooking for the last 70 years eliminates a number of problems considered inherent in the sulphite process and, at the same time, greatly simplifies the operation from both the capital and operating standpoint. Elimination of the excess sulphur dioxide from the cooking liquor results in many advantages.

Processing Advantages

1—Cooking liquor can be made at high temperatures.

2—Liquor can be heated with relief gases and stored at atmospheric pressure.

3—Rapid heating cycle in digester because there is no danger of "burning."

4—Lack of free SO_2 permits higher cooking temperature at same digester pressure.

5—Higher cooking liquor pH reduces reaction between phenols and lignin.

6—Small amount of SO_2 to be relieved greatly reduces relief absorption equipment.

7—Eliminates problem of SO_2 recovery when blowing.

Pulp Quality and Yield

A remarkable range of pulps can be obtained from spruce with this process. In all cases the strength values are markedly higher than those of conventional sulphite and are more nearly comparable with those of kraft pulp and, of course, the yields at given chlorine number or at given percentage rejects are very much higher than those obtained by either process.

The magnefite process is particularly suited to the production of hardwood pulps since they can be obtained throughout the whole range of yields from 90 per cent-plus down to chemical pulps. These latter are produced in two to three hours time at 166°C. Data obtained on Magnefite chemical pulps from elm, mixed hardwood, and poplar were preserved. In general these pulps are obtained in higher yield for a given chlorine number and with markedly higher strength than acid sulphite pulps produced from the same species. In the examples shown, the strength of the pulps was somewhat less than that of the long-fibered conventional spruce sulphite pulp. However, experiments have shown that variations in chip quality can make a very marked difference in strength. The effects of chip quality, which is possibly the most important single variable in this process, is now being actively studied and it is expected that a report will be made on this at a later date.

Semichemical hardwood magnefite pulps of 60 to 70 per cent yield are normally slightly stronger and give bleached pulps in slightly higher yield than the corresponding chemical pulp. The fact that either type of pulp can be produced with the same liquor and recovery system is of special advantage since it is possible to cook to any given yield as may be dictated by economics or product requirements at any given time. When semichemical pulps produced at the same yield from the same wood by the Magnefite and neutral sulphite processes are compared, the magnefite pulp is found to be softer, i.e. more readily disintegrated, to have markedly higher alpha cellulose, markedly lower pentosan and slightly higher lignin content.

Conclusions

In summary, the magnefite process has the following outstanding characteristics:

- It allows establishment of a self-sustaining operation with exceptionally low heat and chemical losses.
- It eliminates the problems of stream and air pollution.
- It allows the use of low liquor-to-wood ratios thus decreasing cooking steam, increasing residual liquor concentration and simplifying continuous digestion.
- It allows the use of a variety of wood species, mixed if desired.
- It allows the production of both chemical and semichemical pulps with a single recovery system.
- It allows the production of high-brightness unbleached, easy-bleaching pulps.
- It allows the production of pulps in higher yield and of greater strength than those produced by the acid sulphite process.

Finally, the simplicity of the combined cooking and recovery operation will result in major savings of capital, maintenance and operating costs.

Investigation of Hydraulic Pressure Pulsations in Wet-End Piping

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Project Engineer
Rice Barton Corp., Worcester, Mass.

An investigation was made of waves appearing on a fourdrinier and producing regular basis weight fluctuations in the finished sheet. It was found that the waves were of constant frequency and in synchromism with the screens, although varying in amplitude. It was shown that the waves are generated by fluctuations in static head of stock at the slice, which are in turn induced by a mechanical vibration of an open screen-chest feeding the fan pump. The relationship of the pulsation to the phasing of the screen motion was determined, it being found that the pulsation was harmful only when the four screens moved in unison. A solution for the elimination of the pulsation is proposed, based on operating the screens in an out-of-phase relationship.

The study points up some important considerations of headbox operating and wet-end plumbing. All pressure fluctuations in the stock at the slice are reflected as variations in the quantity of fiber delivered to the paper machine. Whether due to turbulence, vibration or any other cause, they affect the basis weight of the finished sheet to some degree, and should therefore be reduced to a minimum.

It can also be seen that careful attention should be paid to screen installation, even though the screens are well removed from the headbox. In the particular installation studied, it would have been preferable to mount the screens directly over the supporting columns of the floor.

Also, it is demonstrated that the volume of stock contained in the headbox system, that is from screens to headbox, should be minimized. The hydraulic pulsation induced by a given mechanical displacement is proportional to the mass of fluid displaced. Thus any reduction in mass of stock will reduce the amplitude of mechanically-induced pulsation.

It was also found that the staggered impeller, double-suction fan pump design employed in this installation is singularly free of undesirable pulsation. As this design is of current interest in the industry and many installations have been made in recent years, the confirmation of its effectiveness in reducing pulsation is encouraging.

No information could be obtained on one factor that is at least of scientific interest. This is a long-term variation of intensity of the pulsation. During the time that the measurements just discussed were conducted, the occurrence of pulses varied considerably at the slice in intensity. The past history of the phenomena indicates that some long-term factor, extending over a period, frequently of many weeks, is in effect, which despite the continued existence of pulsation in the screen vat, acts to prevent the occurrence of pulses at the slice of the paper machine.

One can theorize on the possible explanation of this variation. It may be that changes in the type of stock run, conditions of refining, screen level changes, and similar factors, which could alter the amount of energy dissipated in the screens control this factor. It is also possible that some factor in the hydraulic piping or the headbox itself changes the transmission characteristics of the piping.

Theoretically, air in the system would act this way by cushioning the effect of the pulsations and dissipating their energy. However, it does not seem worthwhile to pursue a solution based on the possible use of this long-term factor.

Mixed Stock Control System at Mersey Paper

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Mersey Paper Co. Ltd.

The control of basis weight in an older mill that has been speeded up greatly in excess of its design speed and capacity, is apt to be difficult. Unless improvements and refinements have been applied to each stage of pulp manufacture and stock supply to the machines, this condition can be quite severe.

Mersey Paper Co. has gone to considerable length to control groundwood and sulphite in process, the final step in each being consistency regulation by Fischer and Porter Consistorators. In spite of this regulation difficulties remain, principally in stock regulation to the machines, in the inadequate broke system, in the overstressed electrical drives of the machines causing speed variations, and in intangible stock changes which are not sensed by the regulators.

The system of stock control to the machines developed to combat these conditions is described in this paper. It is concerned with obtaining the most uniform basis weight, as measured by the three-position tests reel by reel. It must be noted that it is of no help in eliminating machine and cross-direction short-term variations which are generally ascribed to headbox conditions and speed fluctuation.

The New System

The new system as designed and developed in co-operation with Process and Steam Specialties, include DeZurik pipeline-type consistency meters used as stuff meters; that is instead of the consistency signal going to a controller to operate a dilution valve, it is used to increase or decrease the volume of stock passing, to hold the weight of fiber constant.

The existing 10-inch range F. & P. Flowrators were used, but in place of the electric transmitters we installed Schutte & Koerting cam-type pneumatic transmitters. By this means we could design and make a cam to give 100 per cent chart for a very small span of the Flowrator, namely 32-85 mm. or less than 42 per cent of the previous range. This, combined with a range reduction of 50 per cent on the speed transmission, enabled us to obtain the increased sensitivity we required.

Regarding the consistency signal, it would at first appear that the speed and consistency signals would have to be multiplied together, but due to the zero suppression on the speed signal (range is 1500-2000 f.p.m.) it can easily be shown that for all intents and purposes it is correct to add the speed and consistency signals. The flow range on the chart is now 1480-2000 U.S.g.p.m. or 1:1.35. Thus at 50 per cent chart a true one per cent change in flow is represented by over three per cent chart change.

The signal output of the DeZurik meters was also aligned to provide the correct gain for a given consistency change and this signal in the range 9-15 p.s.i. is added to the speed signal by a Fisher relay to provide the "modified speed." This "modified speed" signal is fed to a Fisher proportional and reset controller as remote set or pneumatic index.

Incidentally, the relay can not only add the speed and consistency signals, but the resultant signal can be boosted as required to give more or less change in stock flow for a given change in modified speed.

As already mentioned, the flow signal is boosted to provide the correct range by means of the cam transmitter. To the flow signal is added the manual

over-riding adjustment provided by a precision regulator with micrometer dial. This addition also is carried out by a Fisher relay and the resultant flow sig- is fed to the controller as the process measurement. The controlled air is fed to an eight-inch butterfly valve with positioner through an inverse derivative unit. This valve is located in the stock line after the DeZurik unit and Flow-rator and immediately before the fan pump. The valve itself has an auto-manual station in case of trouble, as do both the speed and consistency signals. Provision is also made to feed the consistency signal of either machine into the other in case of prolonged trouble with the DeZurik consistency unit.

Automatic Control of Pulp Chlorination with an O.R.P. Meter

W. H. Bush
Bleach Plant Superintendent, Gaspesia Sulphite Co., Ltd.

The use of oxidation-reduction potention (O.R.P.) meters for process control in bleaching has been confined in the past mainly to systems preparing calcium or sodium hypochlorite. It has now been shown that this type of control is also applicable in the pulp chlodination reaction, since during this reaction the potential is dependent on the relative concentration of chlorine and chloride ion. We have now installed one of these meters in our stock chlorination system.

System Layout

The oxidation potential of a chlorinated stock slurry depends only on the ratio, at any given time, of chlorine and chloride ion. This in turn depends on two factors only, the chlorine demand of the pulp and the reaction time before the measurement is made. Changes in stock consistency do not interfere with control by this measurement, since they are essentially changes in demand. Stock flow rate changes also appear as a demand change unless the system is designed in such a way that there is a change in the retention time in the metering system. In addition changes in chlorine temperature and pressure do not affect the control obtained using this system. Thus the only factor which must be carefully controlled with this type of system is the retention time in the metering system. This should be close to one minute, and should be constant.

The stock and chlorine flow control system now in use is shown in Figure 1.

Since chlorination takes place inside the tower itself it was necessary to take the sample from the interior of the chlorination tower. The sampling point is level with the top of the agitator, so that a maximum mixing of stock and chlorine has taken place before the stock is sampled. Immediately after leaving the tower the stock is diluted with water to approximately one per cent consistency as shown. After running through the retention tank which contains the O.R.P. electrodes, the sample is returned to the blending chest. The retention time from chlorination to the electrodes is about one minute. The reading on the O.R.P. meter is pneumatically transmitted to the oxidation potential controller, which operates the chlorine flow valve. This instrument varies the chlorine flow to hold the oxidation potential constant.

In order to obtain a correct measurement of stock flow with the return flow through the meter, it was necessary to move the stock flow meter to the line feeding unbleached stock to the blending chest. By controlling the flow in this line to give us the desired stock flow rate, and then automatically controlling the blending chest level through the hydraulic coupling on the tower booster pump, we get the correct throughput in the chlorination tower regardless of the return flow and dilution by stock and water going to the meter.

The O.R.P. meter itself is a Foxboro E.M.F. Dynalog Redox receiver with a model 42 pneumatic transmitter. This instrument receives its signal from a Beckman electrode unit situated in the retention tank. The electrodes in this unit are of platinum and silver, no calomel electrode being used. The controllers in this system are Foxboro model 52 consotrols.

Results Obtained

Installation of this meter has led to much improved operation of the bleach plant. Variations in chlorination due to changes in chlorine demand, flow rate, consistency, and chlorine quality have been greatly reduced. Setting of chlorine flow every hour has been eliminated, and permanganate tests on the unbleached stock are no longer necessary. Operation of the succeeding stages has been greatly simplified.

We now feel that our operating crew could be reduced to one man per shift if desired. In the past we have had one man to operate and a second to test. It is now possible for one man to handle both the operating and testing. In our case, due to the location of the bleach plant we do not consider this would be a safe practice, so we are not reducing our crew. In mills where other equipment is operated from the same floor as the bleach plant this is probably possible.

A small but significant improvement in pulp quality has resulted from this addition to our bleach plant instrumentation. More important, bleached stock uniformity is much improved, so that the production of off-grade stock should be much reduced. Changes in grade can be handled more easily and accurately.

The chemical savings which were anticipated have not developed, but we believe the close control of our operating conditions which this meter gives us will enable us to make such savings in the future.

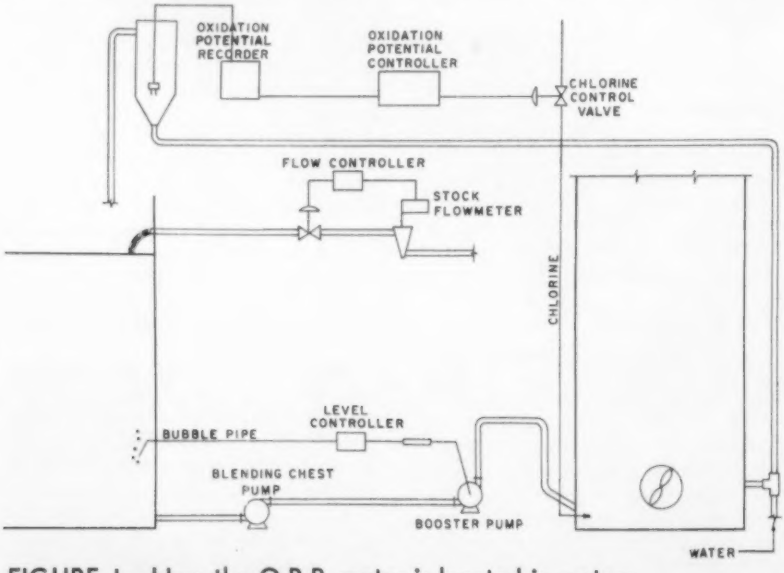


FIGURE 1—How the O.R.P. meter is located in system.

What Happened in the Canadian Industry in 1957

R. M. Fowler
President, Canadian Pulp and Paper Assn.

The total output of the pulp and paper mills in 1957 was a little lower than the all-time record established in 1956. Production during the past twelve months would have been about the 1956 level had it not been for the strike that occurred at the west coast mills towards the end of the year. Nevertheless, the tonnage produced in 1957 was the second highest in history, slightly lower than in 1956 but well above that of 1955. Only on one other occasion in the last thirteen years has the output of the industry declined. This was in 1952 when production, owing to a narrowing of pulp markets abroad was somewhat lower than in 1951.

Four Developments

Four developments occurred during the year that particularly affected the industry and its operations. First, the strength of the Canadian dollar had a serious effect on the revenues of the mills. More than two-thirds of the output of the entire industry was sold abroad in soft U. S. dollars. Second, the first major, area-wide strike in the industry in three decades closed nine mills in British Columbia on November 14. Third, there was no increase in demand for pulp and paper products in our chief market the United States. Finally, productive capacity of the North American industry, particularly in pulps and newsprint, continued to expand without an accompanying increase in consumption. The combination resulted in a reduction of operating ratios, particularly during the latter part of the year.

When compared with manufacturing operations on this continent, where many major industries are operating between 20 and 30 per cent below capacity, the present scale of operations in the Canadian pulp and paper industry reveals once again that the demand for pulp and paper is not as volatile as that for many other basic materials and that given sound management and leadership, the industry can solve its existing problems.

Such confidence is essential if the industry is to meet the needs of its customers in the future. Mills are costly and cannot be brought into production with rapidity. Nor can the industry's expansion be exactly scaled to match increases in consumption. In the past, the problem of expanding production to meet the growing needs of the market has been met in part by speeding up existing equipment rather than by building new mills. But the basic problem remains. In the years to come, the industry will have to invest large capital sums to meet its customers' needs. The financing must come from earnings or from those having confidence in the industry. So the longer term prospects for the industry, and indeed for its cus-

CANADIAN PULP AND PAPER IN 1957
Preliminary 1957 figures

	Production		Exports	
	1957	1956	1957	1956
Gross value of output	$1.4 billion	$1.4 billion	$1 billion	$1.045 million
	Tons	Tons	Tons	Tons
Total wood pulp	10,176,707	10,542,300	2,232,185	2,388,484
Dissolving & spec. chem.	341,411	411,194	291,523	344,551
Bleached sulphite paper grades	583,300	674,765	384,736	443,530
Unbleached sulphite	1,754,162	1,834,146	297,036	379,893
Bleached sulphate	882,970	812,534	716,353	670,281
Unbleached sulphate	775,391	801,285	256,020	225,385
Other chemical	244,823	234,022	41,311	45,628
Groundwood	5,516,713	5,679,983	237,697	268,491
Newsprint	6,396,114	6,468,815	5,901,527	5,971,692
Containerboard	455,495	474,071	57,402	56,555
Boxboard	390,063	412,348	22,262	25,274
Total paperboard	846,008	886,419	79,664	81,829
Fine paper	252,086	248,005	16,270	16,733
Coated paper	29,450	29,167	1,202	1,006
Other printing paper	80,925	92,620	54,590	61,764
Special papers	124,800	122,171	5,218	6,437
Wrapping paper	269,177	280,591	18,836	14,309
Bldg. papers and boards	272,000	281,000	20,000	22,500

There are some slight duplications in the foregoing figures. Some paperboard and wrapping paper is used by the mills for packaging. Coated paper covers a tonnage that undergoes a further processing after it leaves the paper machine and thus is also included under other grades. Total wood pulp production includes screenings, but excludes defibrated and exploded pulp. In addition to wood pulp, the industry uses annually in the manufacture of paper some 470,000 tons of stock including waste paper, straw, rags, cotton linters, flax, leather, jute, rope, and other fibres.

tomers, depend on that future confidence that can flow only from sound management today.

Wood Pulp Production

As the figures in the table indicate, the total wood pulp produced by the mills last year was somewhat lower than in 1956. The pulp consumed in Canadian mills also declined owing chiefly to the strike at the west coast mills.

There was some decline also in pulp exports. Exports of pulp to affiliated mills abroad remained close to the level of the preceding year. Thus the impact of the somewhat narrower market was felt chiefly by the mills exporting market pulp.

There was a sizeable increase in the exports of both bleached and unbleached kraft pulp; but exports of all other grades declined.

Of the pulp produced and shipped by Canadian mills—as opposed to pulp made in integrated mills for conversion into paper and paperboard—some 60 per cent moves to the United States; 25 per cent goes overseas; and the remaining 15 per cent goes to domestic manufacturers.

Pulp Exports

Several factors have tended to limit the export markets for Canadian pulp. Shipments to the United States increased in the post-war years largely because Canadian pulp was displacing pulp from overseas in that market. This trend has about reached its zenith. Again, there was a large increase in the pulping capacity in the United States during the year, but consumption in that market declined slightly. As a result, United States pulp exports have increased substantially and are competing in overseas markets with Canadian pulp. Indeed, Canadian pulp exports to Europe declined by about four per cent this year, whereas U. S. exports to that continent increased by about 20 per cent.

During the last two years, the pulp industry in North America has undergone a rapid and substantial expansion. Thus capacity is considerably in excess of demand. As a consequence, plans for the construction of new pulp capacity on this continent over the next two years have been substantially modified. It now appears that by 1960 the present annual pulp capacity of North America will be increased by about two million tons as compared with an original planned expansion of more than twice this tonnage. The additions to the North American pulp capacity presently in view seem to parallel the long term trend in the demand.

Newsprint Production and Use

Newsprint production in 1957 was a little below that of the record 1956 year, but considerably above the 1955 level. Had it not been for the strike at some of the mills, the newsprint production would, apparently, have been closer to the 1956 record.

The total consumption of newsprint in the United States, which absorbs close to 80 per cent of the Canadian output, declined by about one half of one per cent during the year. There was a larger decline in Canadian shipments to that market. Shipments to the Canadian market were slightly lower also. The decline in shipment to North American consumers was partially offset by a substantial increase in exports to overseas markets.

Production by newsprint mills in the United States increased by about six per cent during the year, there was a substantial decline in United States imports of newsprint from overseas.

B. F. Avery

George M. Hobart

New C.P.P.A. Chairman

George M. Hobart, president, Consolidated Paper Corp. Ltd. was elected chairman of the Executive Board, Canadian Pulp and Paper Assn. at the annual meeting in January. Mr. Hobart succeeds as chairman, B. F. Avery, president, KVP Co. Ltd., Espanola, Ontario.

There was some decline in the volume of advertising space purchased in the daily newspapers in the United States. Meantime, the number of newspaper pages printed in daily and in Sunday editions remained at approximately the level of 1956. While there was some increase in expenditures for TV network advertising, the newspapers still account for about one-third of the total advertising expenditures in the United States which now run to $10 billion annually.

During the year many Canadian newsprint mills increased their capacity. For all of Canada total rated capacity at January 1, 1958 was 482,445 tons greater than on January 1, 1957. As a result, for the first time since 1946, the industry's operating ratio fell well below capacity. But the industry has achieved its objective of being able to meet the present and future needs of its customers.

Fine Papers

The output of fine paper increased by about two per cent during the year. There appeared to be a satisfactory demand for most grades owing in part to the needs of our population which, during the year, increased by some 550,000 persons. Exports of fine paper remained at about the 1956 level and accounted for some six per cent of the output.

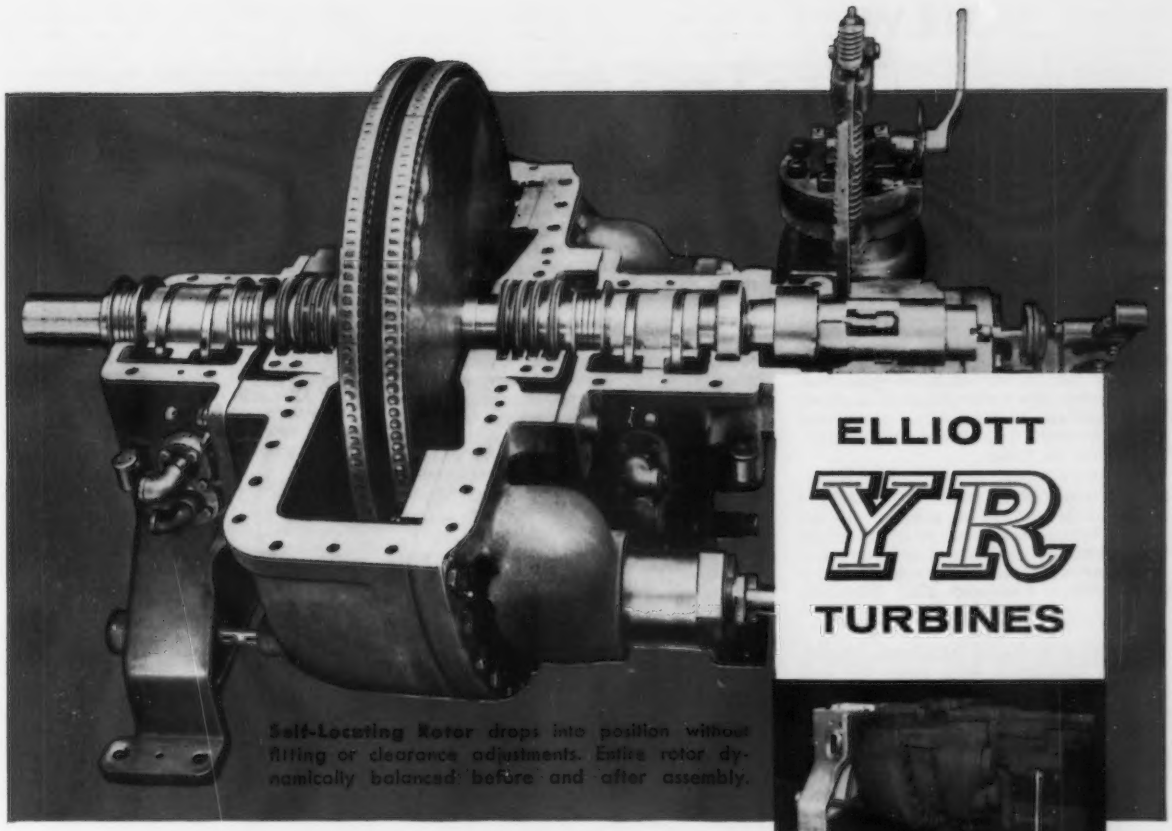
Paperboard

Paperboard production declined by some four per cent from the all time record established in 1956, a specially high peak that was almost nine per cent higher than the preceding year. The decline in the 1957 output was the result of some softness in business activity in Canada at the very time when the specially large increase in production that occurred in 1956 had to be digested. In addition, paperboard continued to experience increasing competition from a variety of newly-developed packaging materials. Meantime, paperboard exports, accounting for nine per cent of the production decreased slightly.

Wrapping Papers

Wrapping paper output declined during the year by about four per cent. The drop in Canadian consumption, though, was considerably less than in the United States. Exports of wrapping paper jumped about one-third above the 1956 level and accounted for seven per cent of the output of the mills. The production of specialty papers reached an all-time high in 1957.

From the annual report presented at the 45th annual meeting of the Canadian Pulp and Paper Assn., January 31, 1958.



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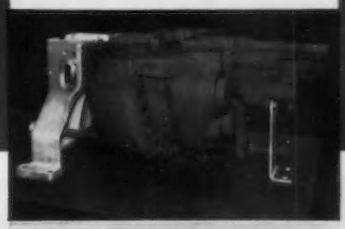

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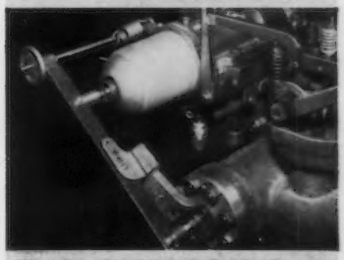
5 design features insure ...easy installation ...easy maintenance

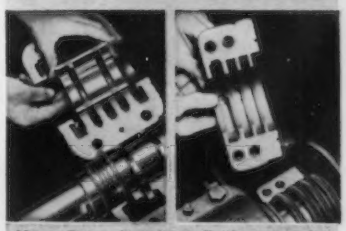
Dependability in long-term, continuous service is the principal reason why Elliott mechanical drive turbines have won such universal acceptance as prime movers for process and water pumps, fans, compressors and other driven machines.

But there's more to it than that. The popularity of Elliott YR single-stage turbines, in sizes from 2 to 600 hp, is also due to simplified design features which provide easy installation and easy access for routine inspection and maintenance. Five of these design features are illustrated here. The Elliott design also permits interchangeability of components from one turbine frame to another.

Other types of Elliott mechanical drive turbines are available, in sizes up to 20,000 hp. And when it comes to application engineering or maintenance assistance, your local Elliott field engineer is always available. For complete details write Elliott Company, Steam Turbine Department, Jeannette, Pa. Ask for Bulletin H-22B.



Weather-Proofed, Reliable Speed-Governing System maintains effective steam seal for long operating periods. Separate overspeed trip gives positive overspeed protection.



Liner Type Bearings (left) are sealed against elements, permit rapid heat transfer to cooling oil, are easy to inspect or replace.

Accessible Shaft Seal Covers (right) are easy to remove for inspection or ring replacement.

ELLIOTT Company

TURBINES FOR DEPENDABLE **day-in/day-out** SERVICE

NEW LITERATURE

BUFLOVAK . . . CUSTOMER LABORATORY. (10p Bulletin) Explains how this laboratory has found the answer to 7,500 processing problems in the chemical, food, pharmaceutical and petrochemical fields. **Buflovak Equipment Div., Blaw-Knox Co.,** 1543 Fillmore Ave., Buffalo, N. Y.

DIFFERENTIAL PRESSURE TYPE FLOW METERS. (Bulletin F-1607) Outlines the theory of head type flow rate meters, the basic primary devices, and describes their uses and characteristics. **Bristol Co.,** Box 1790 L.D.P., Waterbury 20, Conn.

DUST CONTROL AND RECOVERY. (Bulletin GFH-1157) Illustrates and describes this new line of Fluor-Hartman bulk pneumatic conveying, ash handling, dust control and classifying equipment. **Fluor Products Co.,** Whittier, Calif.

FLUID FLOW RATE ALARMS. (Bulletin 165) Describes both magnetic and electronic types of alarms which are available for use with rotameters to meet any flow requirement. Each features a fail-safe circuit design. **Brooks Rotameter Co.,** Lansdale, Pa.

CIGARS AND BRANDY are featured in hundreds of restaurants across the nation in a joint campaign sponsored by the Cigar Institute of America and Browne Vintners Company, distributors of Martell Cognac. The same pleasures can be enjoyed at home, however, with the aid of a well-equipped hostess tray such as Mrs. Charlotte Montgomery, noted women's authority, and Gene Raymond, president of the Cigar Institute, are inspecting. The hostess tray seen here was designed by Plummer's of Fifth Avenue, New York.

GARDNER INSTRUMENTS. (112p Catalog) Describes testing instruments for paint, paper, plastics, etc. and other materials. **Gardner Laboratory, Inc.,** P.O. Box 5728, Bethesda 14, Md.

INDUSTRIAL MINIPUMP. (Bulletin 1257) Illustrates and describes this addition to its line of controlled volume miniPumps, engineered and built for applications requiring laboratory accuracy with industrial ruggedness. **Milton Roy Co.,** 1300 E. Mermaid Lane, Philadelphia 18, Pa.

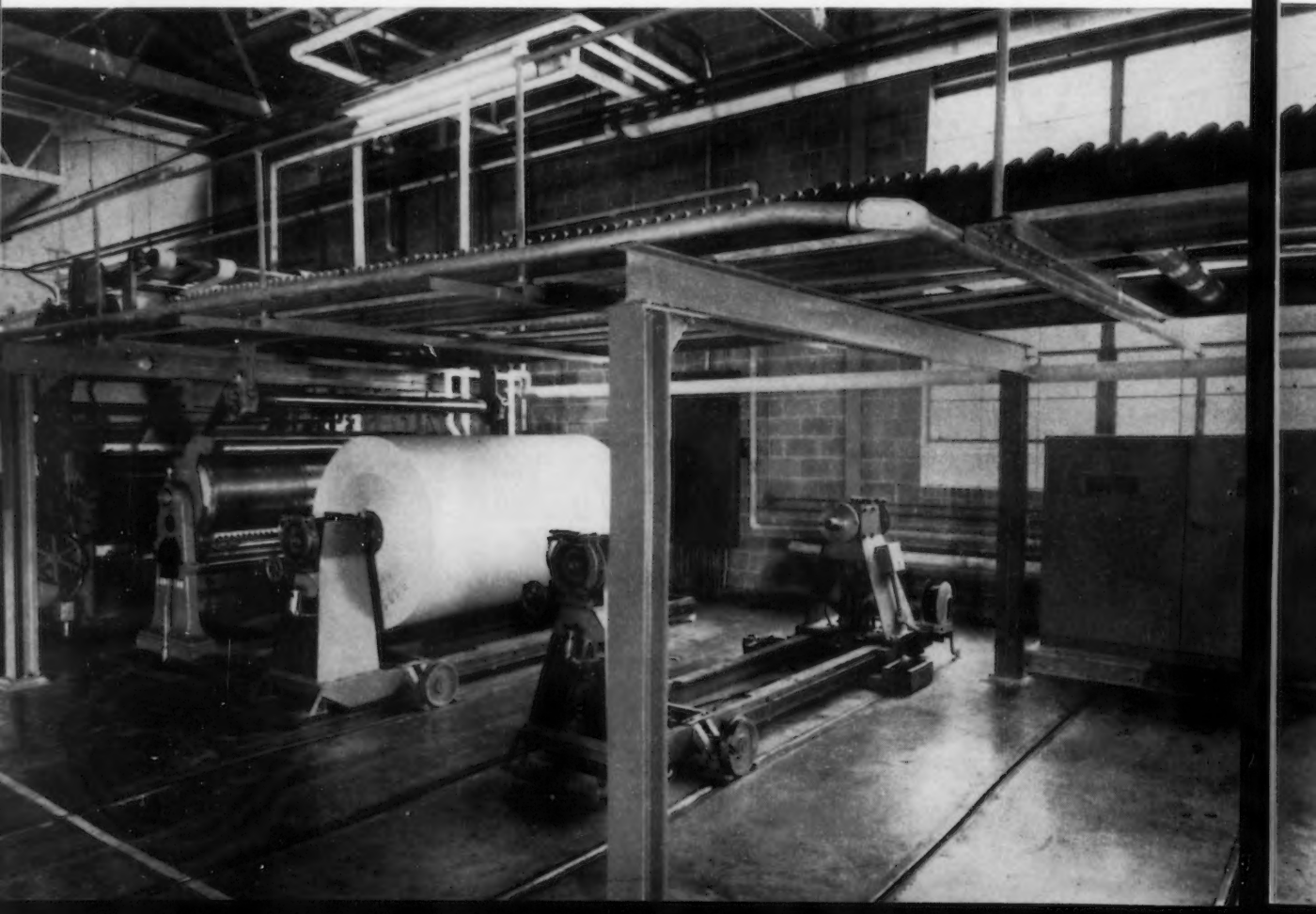
LINK-BELT UNIFLOW SETTLING TANK. (Folder 2648) Contains detail drawings, specifications and three diagrams for determination of tank size and number, and spacing of effluent weirs, based on surface loading and weir loading. **Link-Belt Co.,** Prudential Plaza, Chicago 1, Ill.

LAWSON HEAVY DUTY HYDRAULIC CLAMP CUTTERS. (Folder) Outlines advantages of these cutters, among which are 60% greater speed, almost 20% heavier construction, and an adjustable, truly flexible clamp that conforms to surface contours of irregular lifts of paper. **Lawson Co., Div. of Miehle-Goss-Dexter, Inc.,** 426 W. 33rd St., New York 1, N. Y.

LARGE INDUCTION MOTORS. (Bulletin 1950) Presents detailed information on a full line of motors in ratings from 150 to 1250 h.p. Cutaway drawings and illustrations show the protection they offer. **Louis Allis Co.,** 427 E. Stewart St., Milwaukee 1, Wis.

TOLERANCES. (Technical Data Card 115D) Covers, in detail, the important dimensional tolerances, both cold-drawn and hot-finished, of round, seamless carbon and alloy steel mechanical tubing in various conditions of heat treatment. **Tubular Products Div., Babcock & Wilcox Co.,** Beaver Falls, Pa.

THE INSIDE STORY. (Cutaway Brochure) Describes the Yale Worksaver line of rider-walkie trucks, using sectionalized views and a system of unique die-cut pages. **Yale Materials Handling Div., Yale & Towne Mfg. Co.,** 11,000 Roosevelt Blvd., Philadelphia 15, Pa.



HEATING CABLE. (Bulletin 19-457) Provides up-to-date information on heating cables, their application and installation. **General Electric Co.**, Bridgeport 2, Conn.

LITTLE WINDY AIR VAC. (Volume 5-42) Contains illustrations of various applications, accessory and parts price list, as well as features. **Gardner Laboratory, Inc.**, P. O. Box 5728, Bethesda 14, Md.

AIR AND HYDRAULIC CYLINDERS. (Catalog) Describes their pre-tested line of heavy duty air and low-pressure hydraulic cylinders. They now feel that the heavy duty cylinders will find wide acceptance in plants and equipment automation. **W. G. Rovang & Associates, Inc.**, 1945 N. Columbia Blvd., Portland 17, Ore.

CUSTOM FABRICATION OF PROCESS EQUIPMENT. (Bulletin) Details the facilities, services and qualifications of this equipment fabricator for the chemical, process, food, power, and other industries. Also includes illustrations of typical work. **Niagara Welding & Boiler Works, Inc.**, 811 Linwood Ave., Niagara Falls, N. Y.

CONTROLLED VOLUME DIAPHRAGM PUMPS. (Bulletin 1157) Specifies capacities, presures and materials of construction of this leakproof pump for metering corrosive, obnoxious or toxic chemicals. Also describes the features of this pump. **Milton Roy Co.**, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

FAST'S MODEL B. COUPLINGS. (Brochure) Outlines the principal features and points out that the double engagement design compensates for any type of misalignment of the shafts. Also provides engineering data. **Publications Section, Koppers Co., Inc., Metal Products Div.**, Baltimore 3, Md.

GARDNER PORTABLE GLOSS-METERS AND 45° REFLECTOMETER. (Volume 5-43) Describes their 1958 models which meet many present day specifications that call for gloss and reflectance measurements. **Gardner Laboratory, Inc.**, P. O. Box 5728, Bethesda 14, Md.

GURLEY TESTING INSTRUMENTS. (Bulletin 1400) Features instruments with complete automatic timing. Also includes a section on spare parts and accessories. **W. & L. E. Gurley**, 514 Fulton St., Troy, N. Y.

HOW YOU BENEFIT BY PROPER COMPRESSED AIR PROCESSING! (Form 589) Helps you to make better use of your compressed air power and tells of the advantages to be gained through simple, low cost compressed air processing. **C. A. Norgren Co.**, Englewood, Colo.

SEYBOLD FULL HYDRAULIC CUTTERS. (12p Booklet) Shows how these cutter-trimmers are used in paper mills and commercial finishing departments. Also includes specifications and floor-plan diagrams. **Harris-Seybold Co.**, 4510 E. 71st St., Cleveland 5, Ohio.

SYNTRON PRODUCTS. (Condensed Catalog) Includes 60 pages of product illustrations, descriptions and specifications, as well as photos of typical installations. **Syntron Co.**, 587 Lexington Ave., Homer City, Pa.

SCHIELD BANTAM GENERAL EQUIPMENT. (36p Catalog) Offers complete specifications and capacities for their entire line. Also describes ten specially designed attachments and includes on-the-job reports and job action photos. **Schield Bantam Co., Inc.**, Park St., Waverly, Iowa.

RUST VETO SPRAY. (Product Data Sheet) Outlines various properties of the film spray and lists some of its uses in manufacturing plants, tool and die shops and the home workshop. **E. F. Houghton & Co.**, 303 W. Lehigh Ave., Philadelphia 33, Pa.

ROCKWELL 400-C HIGH-PRESSURE HYDRAULIC HAND GUN. (Bulletin V-608) Includes description and operating instructions, as well as for care and maintenance of this gun. Also provides parts list to facilitate ordering. **Rockwell Mfg. Co.**, 400 N. Lexington Ave., Pittsburgh 8, Pa.

V-BELTS. (Booklet S-51107) Describes in words and with pictures how raw materials and finished belts are tested and inspected. One section explains quality control procedures and another covers experimental production. **Dept. 794, Goodyear Tire & Rubber Co.**, 1144 E. Market St., Akron 16, Ohio.

Westinghouse AV-DRIVE gives 10-second minimum to maximum corrugator capacity

Smooth, controlled deceleration is provided by a Westinghouse AV-Drive for this corrugator at the Eddy Paper Corporation. Now this unit can be slowed from 600 to 60 fpm in as little as 10 seconds, while necessary changes are being made for another order.

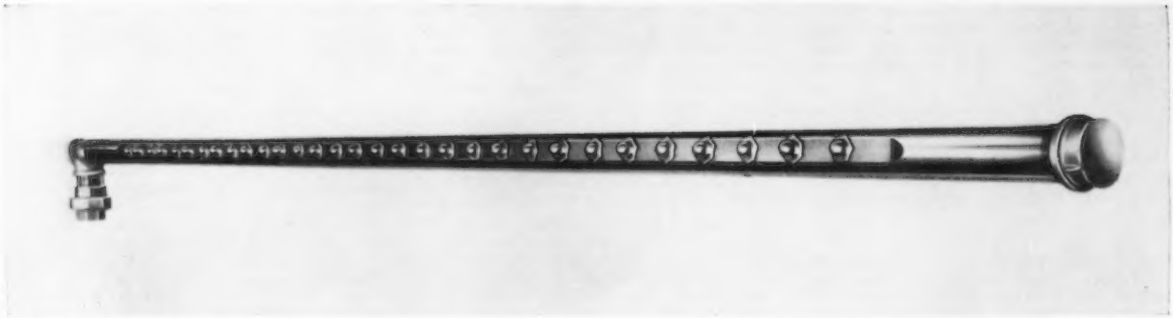
After a year of almost constant operation, Westinghouse AV-Drives are still giving top-notch, trouble-free performance at this installation.

Do you have an adjustable speed drive problem? Call your local Westinghouse representative, or write Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pennsylvania.

J-22097

POWER-UP starts with CONTROL

YOU CAN BE SURE...IF IT'S Westinghouse



New Non-Clogging Showers for White or Fresh Water

Unique new nozzles free themselves automatically of small particles. Larger plugs are removed by simply closing and opening the water valve on the shower pipe.

F. Henry Goyette
Chief Engineer, Lodding Engineering Corp.
Worcester, Mass.

White-water showers have many points in their favor. For instance, they can be used where dilution of stock would be detrimental. They also are great water conservers and in many mills this alone dictates their use. In the past, however, one big factor has militated against a more widespread acceptance; namely, clogging.

New Design

In a search for a shower that was easy to clean when it became clogged. Lodding Engineering Corp. has achieved a new design that is virtually non-clogging.

Since nothing is proof against clogging in all circumstances (an eight-inch pipe will clog if a big enough wad of broke gets in), it is still necessary to provide for easy cleaning and the new Lodding design does that, too.

Automatic Freeing

Reference to Figure 1 shows the basic design of the Lodding nozzle. Large, clear passages bring the white water right up to the shaping parts. Should a lump of stock attempt to clog the nozzle the usual response is an oscillation of the piston automatically freeing the passages.

Easy Cleaning

If, however, the lump is too big or solid, it will sometimes clog. When the operator notices one or more nozzles inoperative, he shuts off the shower. This action automatically withdraws the pistons, opening all passages wide, as shown in Figure 2. He immediately reopens the valve and as the water starts flowing contaminants are flushed out.

Removal Is Easy

Since the nozzles are screwed in place, rather than soldered, their removal is easy, making periodic thorough cleaning of pipe and nozzles easy.

Heavy Particles Eliminated

Figure 3 shows how the nozzles project inside the pipe a sufficient distance to prevent heavy particles such as metal, scale, chips, etc. from plugging. These heavy particles sink to the bottom of the pipe and can be flushed out by removing the end cap. If contaminants such as these are common a valve can be substituted for the end cap and paper makers rather than maintenance men can flush the shower at will.

Space Requirements Minimized

Because the spray fan is tangential to the pipe rather than at right angles as is more usual, space requirements are minimized. Ample spread is achieved in four inches to 4½ inches from the center line of the pipe to the sprayed surface. Figure 4 shows how overlapping fan sprays are produced by having every other nozzle project out about a quarter of an inch farther than the others.

Ease of Replacement

An additional advantage to the user results from the screw-in type of mounting. This is ease of replacement. Spare

nozzles can be kept on hand and worn ones returned to the manufacturer for rebuilding. This also allows changes in spray specification to be made without replacing the whole shower.

Variety of Spray Shapes

The wearing parts are the spray shaping elements and the nature of these allows an infinite variety of spray shapes from needle to full fan. This in turn makes this type of shower widely applicable. Some typical uses are foam-killing in head boxes, knock-off on fourdrinier wires, both inside and outside wire rolls, cylinder molds, screens, save-alls, felts.

Use Not Limited

These showers are not limited in use to white-water and can, of course, be used with fresh water. Some advantages are: less need for filtering and adaptability.

A water oscillator is available for the shower.

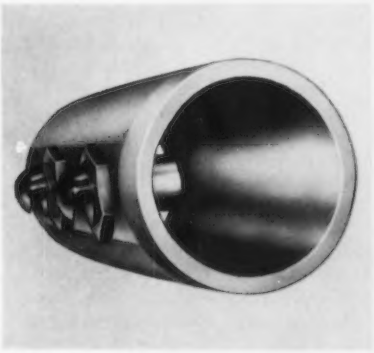


FIGURE 3—Nozzles project inside pipe to prevent heavy particles from plugging.

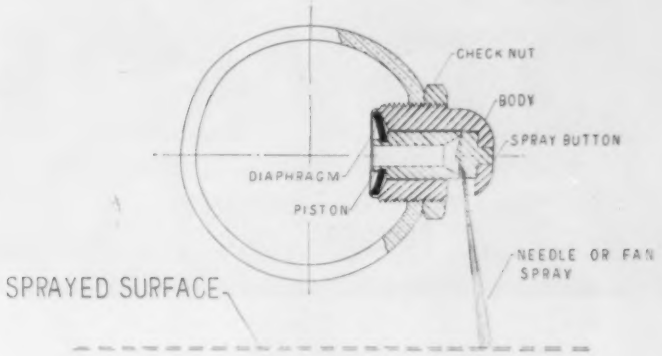


FIGURE 1

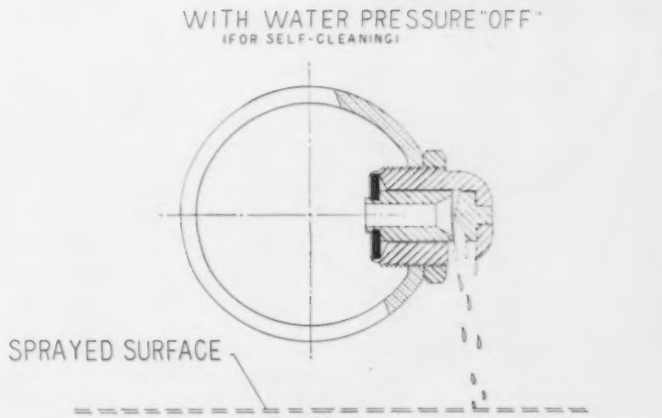


FIGURE 2

FIGURE 1 (above)—Nozzle in operation. Small particles if lodged cause piston to oscillate and free them. FIGURE 2—Shower shut off. Piston has retracted and cleaned passages of larger obstructions.

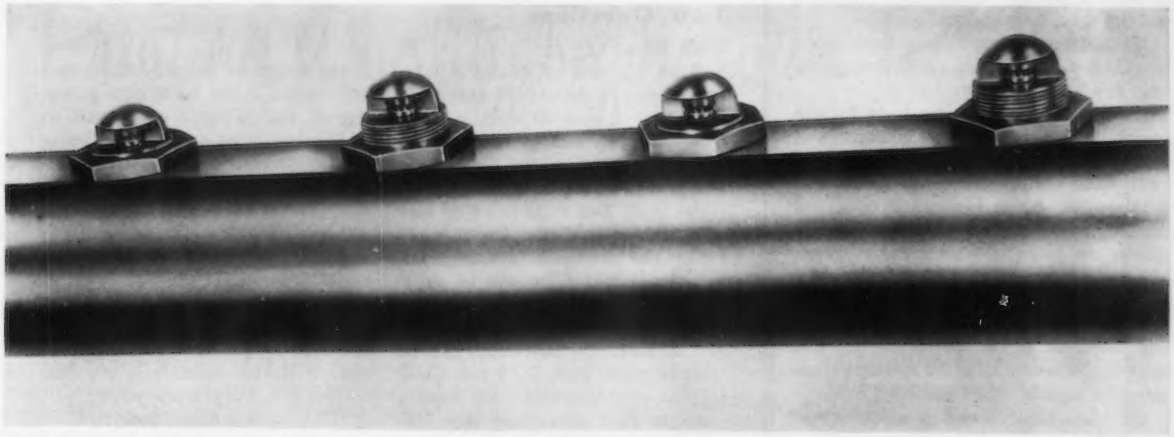


FIGURE 4—Overlapping of fan sprays is obtained by having every other nozzle project out about a quarter of an inch farther than its neighbors.

Maintaining Hydraulic Systems On Industrial Trucks

When was the last time something went wrong with the hydraulic system of one of your industrial trucks? In many cases, a minor operating defect in this system can be quickly and simply corrected—if maintenance personnel know what to look for. Because of this lack of basic understanding by many people, the following information is offered by John Drexler, assistant chief engineer and service manager of the Elwell-Parker Electric Co.:

Problem No. 1: **Low working pressure.**

Look for: Worn pump or pump motor, low voltage, loose electrical connection or hose line restriction.

Problem No. 2: **No motion, slow or jerky motion of the elevator or the mast when tilted.**

Look for: Weak or broken relief valve, scored relief plunger or seat, worn or broken seal (O-Ring), dirt or foreign matter, a plunger which does not open all the way, or a sticking plunger.

In addition: Check air in lines, worn packing, packing cups or broken packing cup back-up rings.

Remedies: Replace weak or broken parts; lap in relief valve plunger seat with light grinding compound; replace seal, flush entire system; adjust control leakage for equal plunger strokes and replace return spring if broken; remove scores on plunger with medium grade emery cloth dipped in oil; replace spring.

In addition: Bleed cylinder by relieving bleeder screw or breaking line coupling screw; with oil at working pressure; or replace worn parts.

Problem No. 3: **Load on cylinder will not hold.**

Look for: Oil by-passing the valve plunger.

Remedy: This condition can only be corrected by the truck manufacturer by rehoning the plunger bore and replacing the plunger with an oversize valve. Note: Be sure to check the cylinder, since in some cases, wear in the cylinder or packing will allow load to drop.

Problem No. 4: **Seeping packing gland.**

Look for: Worn or damaged packing assembly, damaged auxiliary O-Rings.

Remedy: Adjust or replace packing assembly; replace auxiliary O-Rings.

Problem No. 5: **Tilt speed of mast is normal on backward movement, but sluggish on forward movement.**

Look for: Foreign matter or obstruction at tilt check needle.

Remedy: Back-off needle valve by relieving lock nut; operate tilt; tilt motion both directions; reset check for desired tilt motion; lock jam nut.

Problem No. 6: **Holding pressure of attachments drops.**

Look for: Foreign matter lodged on valve seat of check valve, worn or pitted plunger check valve seat, weak pressure spring of check valve, worn packings of cylinder, also first six factors listed in Problem No. 2.

Remedies: Flush out check valve; lap in seat if badly pitted or replace check valve; replace pressure spring; replace worn packings; also first six factors listed in remedies portion of Problem No. 2.

Because of space limitations, complete details cannot obviously be offered herewith. However, additional information may be obtained, without charge, from Elwell-Parker Electric Co., 4544 St. Clair Ave., Cleveland 3, Ohio.

Two Questions

Dear Sir:

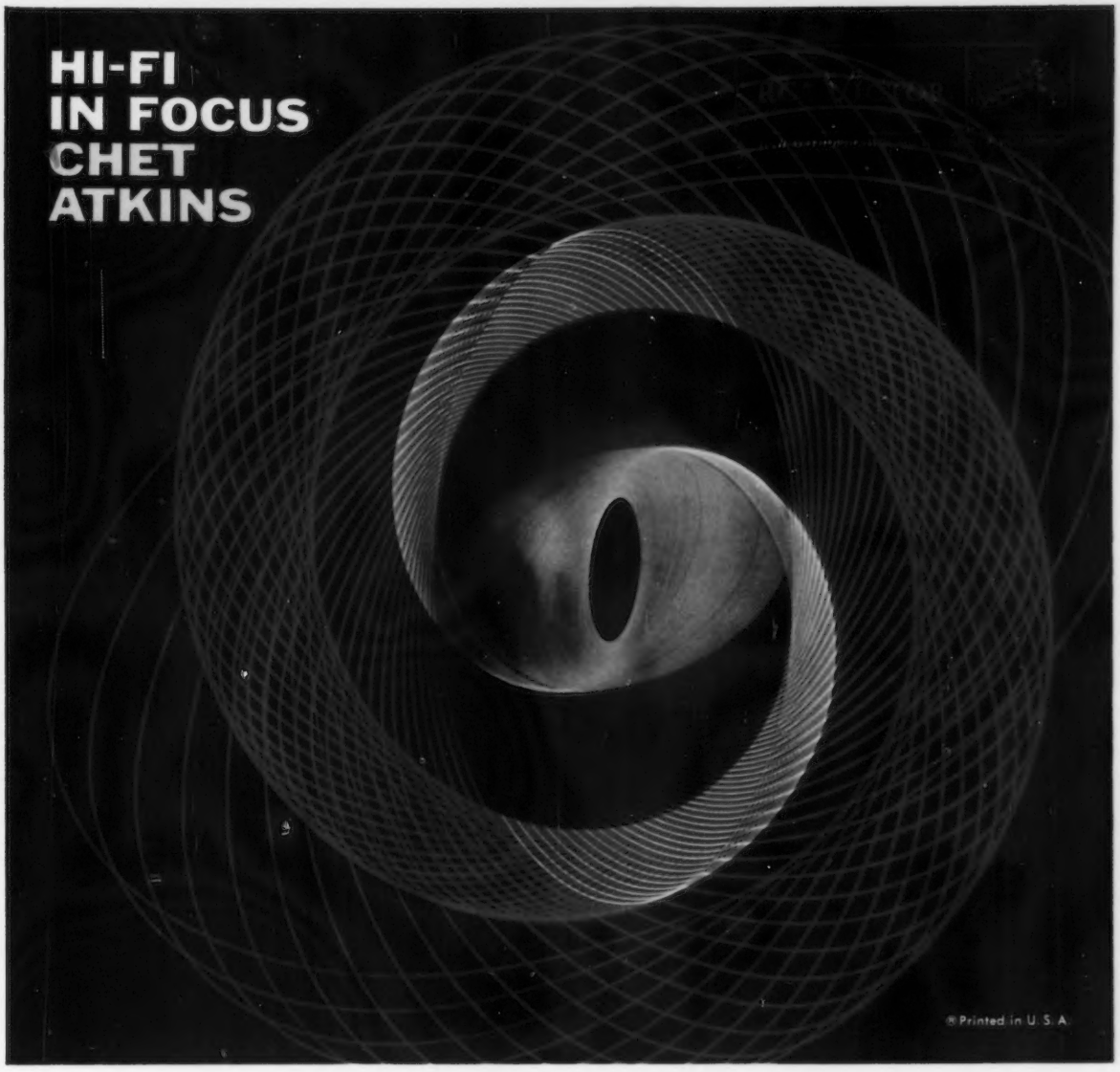
I am a grower of quality Christmas trees and decorating materials. This year I plan to start a small tree nursery, selling fine quality trees and shrubs.

I read in your magazine a few issues back, that there is a new way of making fertilizer from wood bark. The article was very brief, and decided to write you to see if I could obtain more information.

I am also looking for a supplier of cardboard cartons which can be used to plant trees in. I saw these cartons in a magazine, but cannot seem to find out where they can be purchased. They are made of heavy paper or possibly fiber, and are shaped in the form of a gallon jug or can. They are referred to as disposable cans. They are being used by nursery men. After coating with tar, trees or small shrubs are planted in them. The plants are sold container and all and enable the home owner to plant trees almost anytime in the year without fear of losing the trees.

If you know of any firm making this type of carton I would appreciate it if you would help me out.

Very truly yours,
Raymond Jedrich
Turin, New York.



Printing Quality begins with Rhoplex

If you're a printer, we invite you to examine this advertisement. It shows a prize-winning EP Album, provided through the courtesy of RCA Victor Records and Canon Camera Co., which we have reproduced by letterpress printing on paper coated with RHOPLEX—an all-acrylic emulsion binder for pigments. You'll find that RHOPLEX-coated paper or paperboard gives you outstanding definition and brilliance on its very smooth surface. You'll also notice its good ink receptivity, varnish holdout, and freedom from picking. If you're engaged in food packaging, you'll appreciate the absence of objectionable odors. If you're a papermaker, you'll welcome the mechanical stability of the RHOPLEX resins, which assures you of trouble-free operation of your coating equipment.

For more information regarding RHOPLEX B-60A and RHOPLEX B-15—the original, all-acrylic binders for paper coatings, write for our booklet, RHOPLEX *Acrylic Emulsions in Paper Coatings.*

Chemicals for Industry

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

Representatives in principal foreign countries

RHOPLEX *is a trade-mark, Reg. U.S. Pat. Off. and in principal foreign countries.*

POWELL

world's largest family of valves

Fig. 2342—Stainless Steel Swing Check Valve for 150 W.P. at 500F. Bolted cap, flanged ends. Can be furnished with screwed ends. Also made for 300 and 600 W.P.

Fig. 2193—Ni-resist O.S. & Y. Gate Valve for 200 W.O.G. One of a line of Ni-resist valves for services where high nickel-iron alloy valves are required.

Fig. 1861—Stainless Steel Globe Valve for 200 W.P. at 500F. Union bonnet, screwed ends. Valves with flanged ends and angle valves can be supplied.

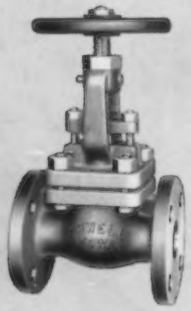


Fig. 2475—Stainless Steel O.S. & Y. Globe Valve for 150 W.P. at 500F. Screwed end valves of this design are also available.

Fig. 2453G—Large Stainless Steel Gate Valve for 150 W.P. at 500F. Outside screw rising stem and yoke. End flanges conform to MSS SP-42.

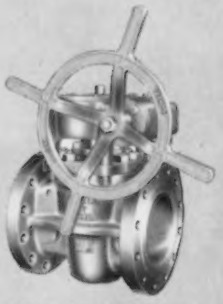


Fig. 3059G—Steel Lubricated Plug Valve for 300 pounds. Bolted gland type. Worm gear operated in sizes 6" to 12".

FOR EVERY FLOW CONTROL PROBLEM Powell offers more kinds or types of valves, available in the largest variety of metals and alloys, to handle every flow control requirement. Your local valve distributor will be glad to tell you all about them. Or write to us for the full facts.

THE WM. POWELL COMPANY • *Dependable Valves Since 1846* • **Cincinnati 22, Ohio**

AVAILABLE—A vertical motor with full capacity for thrust loads

Here's a vertical motor that can take maximum hydraulic thrust . . . and handle the weight of rotor, drive shaft and pump parts. It has been designed by Allis-Chalmers to give you a really dependable pump drive.

In addition to high-thrust capacity bearings, this motor offers heavy-duty cast-iron frame, efficient ventilation, in-service lubrication, and outstanding electrical protection in both hollow and solid shaft designs.

Get the facts on "long-run" power from your A-C district office or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

A-5550

ALLIS-CHALMERS

PRICES OF FIBERS

MARKET WOOD PULP

FIRST QUARTER CONTRACT PRICES PER SHORT AIR-DRY TON

Delivered Basis

	U.S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$82.50/ 90.00	$82.50/ 90.00	§$90.00/ —	§$90.00/ —	§$90.00/ —
Bleached Gw'd.	$97.50/100.00	$97.50/100.00			
Kraft, Blchd.	157.00/ —	160.00/162.50	$157.00/162.50*		$157.50/ —
Kraft, Blchd. Hdwd.	152.00/ —		$137.00/ —		
Kraft, Semi-bleached	140.00/ —	140.00/ —			
Kraft, Unbl.	117.50/125.00	125.00/130.00	†125.00/130.00	125.00/ —	
Sulphite, Blchd.	155.00/ —	155.00/ —	*155.00/ —	*155.00/ —	155.00/ —
Sulphite Bl. Hdwd.	150.00/ —				
Sulphite, Unblchd.	135.00/ —	135.00/ —	†135.00/ —	*130.00/ —	
Sulphite, Unb'l. Gl'sn		134.00/ —	†134.00/ —		
Soda, Blchd.	147.00/150.00	150.00/ —			

§ On Dock Atlantic Ports. * Freight allowed. † Varying Freight Allowances

NEW YORK RAG MARKET

New Domestic Cotton Cuttings

Delivered Mill Basis

PRICES NOMINAL

	Per 100 lbs.
No. 1 White Shirts	$13.50/$14.00
No. 1 Unblchd. Muslins	16.00/ 16.50
Blchd. & Unblchd. Underwears	15.00/ 15.50
No. 1 Light Silesias	6.75/ 7.25
No. 1 Light Blue Overalls	7.00/ 7.50
Percales	6.00/ 6.50
No. 1 Light Prints	5.00/ 5.25
Suntan Khakis	5.50/ 6.00
Cottonades	3.00/ 3.50
No. 1 Washables	2.50/ 2.75

Old Domestic Cotton Rags

(Prices to Dealers, f.o.b. Ship. Pt.)

	Per 100 lbs.
Mixed White	$3.00/$3.25
Cotton Pants & Overalls	2.00/ 2.25
Twos and Blues, Repacked	1.50/ 1.75
No. 2 Roofing	.50/ .60

COTTON LINTERS

Memphis Market

f.o.b. Oilmills

Week Ended February 7	For 100 lbs.
Grade 1 n.a.	
2	$9.50/ $9.25
3 1 cut—felting	8.50/ 8.00
4	7.75/ 7.00
5	6.75/ 6.25
6	6.00/ 5.50
7	5.25/ 5.00

*Based on 73% cellulose.

Old Rope & Bagging

(Prices to Dealers, f.o.b. N.Y.)

	Per 100 lbs.
New Burlap Cuts	$4.50/$5.50
Scrap Burlap	3.50/ 4.25
Australian Wool Pouches	5.00/ 5.75
Gunny	4.75/ 5.00
No. 1 Domestic Manila Rope	7.00/ 7.75
No. 1 Foreign Manila Rope	6.25/ 6.50
Domestic Sisal Strings	4.00/ 4.50

WASTE PAPER MARKET

Mill Prices, f.o.b. Trucks Shipping Point — Includes Brokerage

These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal.

	New York	Boston	Chicago	Los Angeles
	February 3	February 3	February 3	February 3
No. 1 Mixed Paper	$5.00/ $8.00	5.00/ 7.00	4.00/ —	12.00/ —
No. 1 News	13.00/ 15.00	14.00/ —	16.00/ —	12.00/ —
Overissue News (Lg. size)	16.00/ 18.00	11.00/ 14.00	21.00/ —	16.00/ —
Mill Wrappers	11.00/ 13.00	12.00/ 14.00	7.00/ —	13.00/ —
Old Corrugated Containers	21.00/ 22.00	20.50/ 21.00	20.00/ —	20.00/ —
Super Resorted Kraft Paper	30.00/ 35.00	35.00/ 42.50	35.00/ —	45.00/ —
New Double Kr. Ld. Corr. Cuts	25.00/ 30.00	32.50/ —	32.50/ —	30.00/ —
(Semi-chem. medium)	40.00/ 45.00	37.50/ 45.00	40.00/ 45.00	35.00/ 45.00
New 100% Kraft Corr. Cuts	50.00/ 55.00	50.00/ 55.00	55.00/ —	45.00/ —
New Br. Kraft, Env. Cuts	65.00/ 70.00	70.00/ 75.00	55.00/ —	50.00/ 55.00
New Br. Kr. Bag Waste Prntd.	55.00/ 60.00	55.00/ 60.00	50.00/ —	45.00/ 50.00
New Br. Kr. Bag Waste Unprintd	60.00/ 65.00	65.00/ 75.00	65.00/ —	45.00/ 50.00
No. 1 Groundwood Shvs.	25.00/ 30.00	24.00/ 30.00	16.00/ —	25.00/ 30.00
White Newsblanks	50.00/ 55.00	50.00/ 57.50	35.00/ —	55.00/ —
No. 1 Soft White Shvs.	55.00/ 60.00	60.00/ 65.00	55.00/ —	— / —
Super Soft White Shvs.	65.00/ 75.00	75.00/ 85.00	65.00/ —	— / —
Hd. White Shvs.	90.00/ 95.00	100.00/110.00	90.00/ —	85.00/ 90.00
Hd. White Env. Cuts	115.00/125.00	120.00/130.00	100.00/ —	100.00/110.00
Col. Tab. Cards	50.00/ 60.00	55.00/ 62.00	47.50/ —	37.50/ —
Manila Tab. Cards	60.00/ 70.00	70.00/ 75.00	65.00/ —	75.00/ —
No. 1 Col. Ledger	28.00/ 33.00	30.00/ 32.50	40.00/ —	20.00/ —
White Ledger	45.00/ 50.00	50.00/ 55.00	52.50/ —	35.00/ —
Mixed Book & Mag.†	18.00/ 19.00	19.00/ 20.00	12.00/ —	— / —
No. 1 Books‡	25.00/ 27.00	22.00/ 24.00	27.50/ —	— / —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% of groundwood.

PRICES OF MATERIALS

Aluminum sulphate:
- coml. bulk, c.l. wks. cwt. 2.00 / —
- iron-free, c.l. wks. cwt. 3.55 / —

Casein, acid prec.:
- dom. sh. pt. c.l. (30 mesh) cwt. 56.00 / —
- Arg. ex. dock cwt. 20.75 /21.50
- New Zealand cwt. 24.00 /25.00

Caustic soda:
- c.l. wks. solid, 76% cwt. 4.30 / —
- flak. & grd. drums, c.l. cwt. 4.70 / —
- liquid 50% tanks 2.90 /
- liquid 73% tanks 3.00 / —

China Clay
- dom., dry-grd., airfloat:
  - 325 mesh bgs., c.l. Geo. ton 10.00 / —
  - 300 mesh, bgs., c.l. Geo. ton 13.50 /14.50
- imp., white, lump, c.l. ex. dock 20.00 /35.00

Chlorine:
- single-unit tanks, works cwt. 3.15 / —
- multiple unit, 2-5 cars per yr. 5.25 / 4.05

Lime:
- hydrated, bulk, c.l. N.Y. ton 23.63 / —
- quicklime, bulk, c.l. N.Y. ton 22.13 / —

Gum rosin:
- K, M. N, drums, c.l. Savan, cwt. 7.70 / 7.80

Rosin size:
- 70%, gum & pale paste, tank cars, south, sh. pt. cwt. 7.38 / 7.48

Saltcake:
- dom. bulk, 100% anh. wks. ton 28.00 / —

Soda ash:
- light, 58% ash bags, wks. cwt. 1.85 / —
- bulk, c.l. wks. cwt. 1.60 / —

Sodium chlorate:
- drums, c.l., wks. cwt. 9.00 / —
- drums, l.c.l., wks. cwt. 9.50 /10.50

Sodium peroxide:
- dms., c.l. E. of Miss. lb. .20½/ —
- l.c.l. (same basis) .21 / .21½

Sodium silicate, 40° Be.:
- tank-cars, wks. cwt. 1.20 / —
- drums, c.l. wks. cwt. 1.55 / —
- 47° Be. WW.
- tank-cars, c.l. wks. cwt. 1.90 / —
- drums, c.l. wks. cwt. 2.25 / —

Soybean, protein:
- chem. isol., wks. c.l. bags lb. .23 / —

Starches:
- Corn, multiwalls, c.l. prod. plant:
  - pearl cwt. 6.49 / 6.75
  - white, dextrins cwt. 8.08 / 8.20
  - chlorinated cwt. 8.25 / 8.35
  - potato, Idaho, c.l. wks. cwt. 6.35 / —
  - East, fr. all. 50 cents cwt.
  - potato, Maine, f.o.b. wks. cwt. 6.25 / —

Sulphuric acid:
- 60° Be. cbys. c.l. wks. cwt. 2.00 / —
- l.c.l. wks. cwt. 2.45 / —
- tank-cars, wks. ton 18.60 / —

Sulphur:
- crude, c.l. mines, contract, long ton 23.50 / —
- f.o.b. vessels Gulf dock ton 25.00 / —

Sulphur dioxide:
- liquid, coml. cyl., wks. lb. .10 / .12
- multi-unit cars, wks. lb. .0535/ —

Talc, fibrous grd., bags:
- c.l. wks., N.Y. ton 28.00 / —
- l.c.l. wks., N.Y. ton 31.00 /36.00

Titanium dioxide:
- anstase, c.l. dlvd. E. bags lb. .25½/ —
- l.c.l. dlvd. lb. .26½/ —
- rutile, c.l. dlvd. lb. .27½/ —
- l.c.l. dlvd. lb. .28½/ —

Oldest and the Newest in NSSC Pulping

Charles N. Rogers

Sonoco Products Co.
Hartsville, S. C.

Sonoco, one of the original producers of semichemical pulp, has recently installed the most recent design of continuous digester. Here is the first description of this installation

Operations at Hartsville were begun about 1890 with the construction of a sulphite pulp mill. In 1891 pulp was being produced from Southern pine. This mill probably was the first to successfully accomplish this feat. Around 1927 or 28, Carolina Fiber Co., later Sonoco Products Co., began manufacturing pulp by the NSSC process from hardwoods, principally black gum. A year or two prior to this, Mead Corp. manufactured pulp by the NSSC process from tannin extracted chips; so we can't say we were the first. However, we were the first, I believe, to go from raw chips to the finished product.

During the 1930's we manufactured both .009-inch corrugating medium and butcher's paper from the NSSC pulp. The light colored butcher's paper was made by increasing the sulphite to carbonate ratio to about seven to one, giving us a product we sold as white. Other darker shades were made by the addition of colors, as required. Throughout these early years, we had what seemed to be more than our share of troubles. We tried numerous types of refining equipment and finally ended up with about the same as we now have.

Wood Handling

Wood enters the plant through the gate by the checker's office and scale house into the woodyard proper. We are weighing wood now to build an experience based on which we hope later to purchase by weight. There are two wood piles, one on each side of the conveying flume. Practically all of our wood comes in by truck from local independent producers within a 30-mile radius. Wood is used from one pile while the other pile is being built up so as to assure uniform aging and moisture. Practically all wood coming in is put on the piles and then, in rotation, put in the flume.

The flume is in the shape of a "U" with the bottom being three feet in diameter and the top arms spread to five feet. The depth is five feet. We are fortunate in that the water for the flume is taken from the lake and is discharged to the tail race of the hydroelectric plant. No pumping is required. It may be of interest to note that if the water used by the flume had gone through the turbines it would have generated about 3½ h.p. Compare that to the power required by a pump to circulate the flume water.

The logs, on leaving the flume, enter the flume discharge conveyor which is wider than the logs are long to assure no stoppages at the end of the flume. We now operate a 12 ft. x 30 ft. barking drum and have a 12 ft. x 45 ft. drum under construction. Our chipper is a 96 inch disk with 10-27 inch knives operating at 325 r.p.m., being belt driven from a 400 h.p. wound rotor motor.

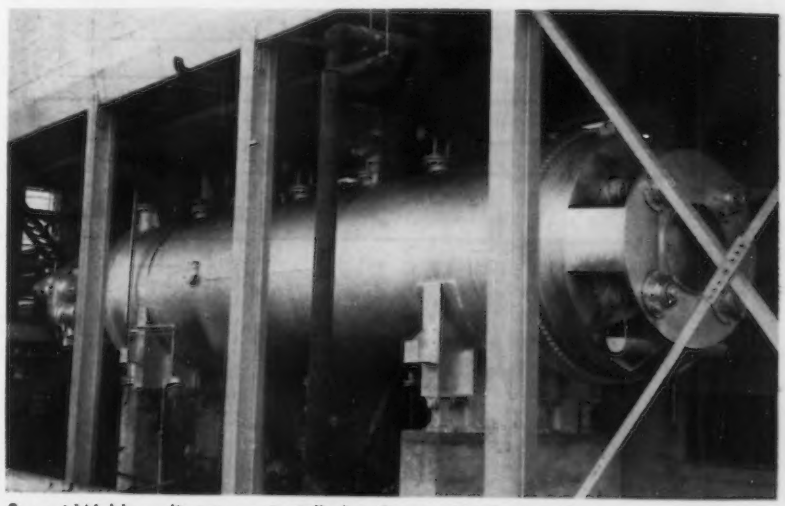
Liquor Preparation

In cooking liquor preparation soda ash from the storage silo is dissolved batchwise. This solution is sulphited by circulating it through the absorption towers, packed with Raschig rings, through which SO_2 passes from the two sulphur burners. We attribute our success in doing as good a job as we do to the fine quality of the water which we have in the lake. The water is slightly acid, soft, and very free of chemicals. In fact, it is used in our 400 lb. 650°F. boilers without extensive treatment.

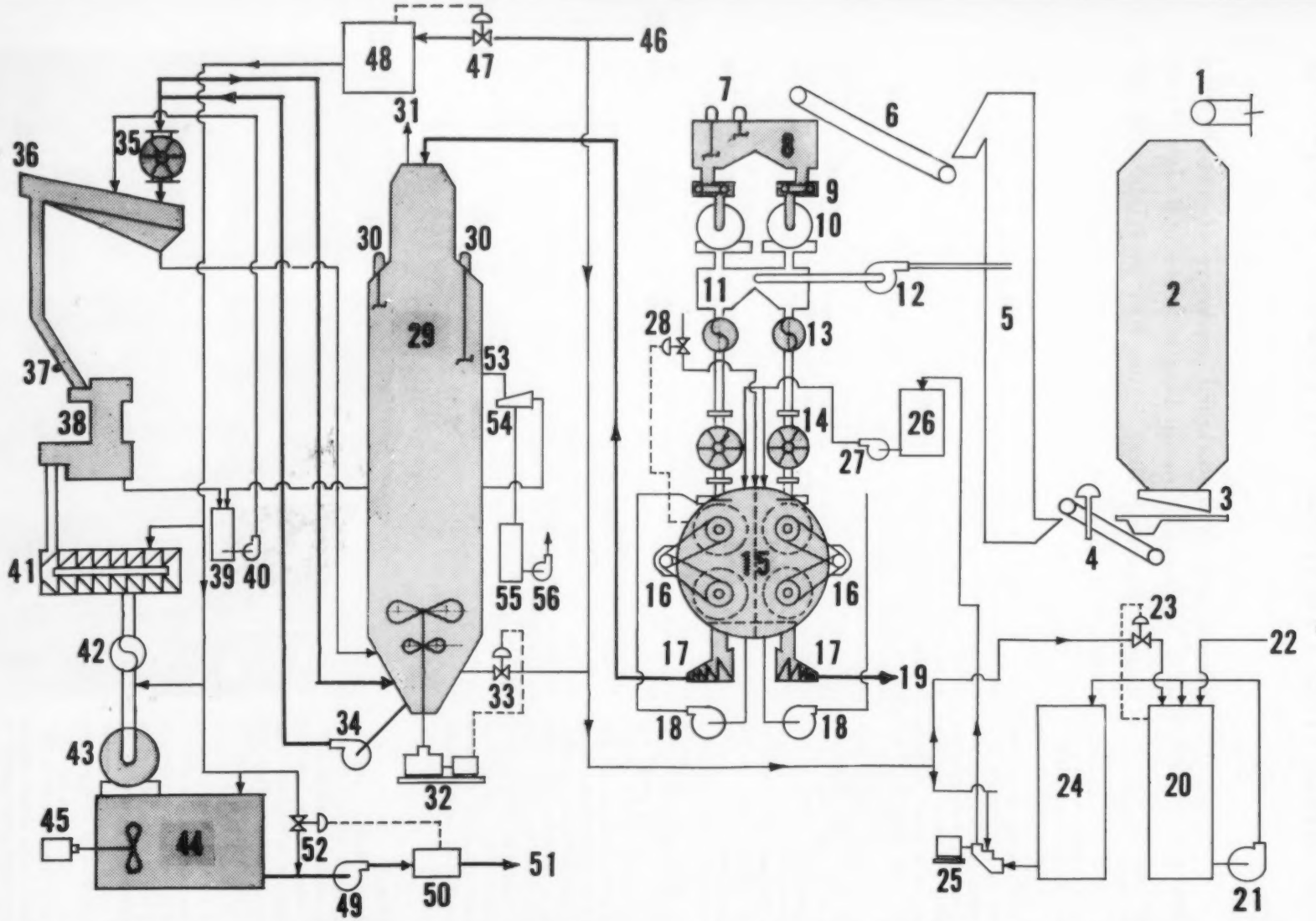
Old Mill

The old pulp mill was as rotary digester installation. The chip handling conveyors distribute the chips to the four chip bins located above the four 15 ft. rotary digesters. Cooked chips discharge from each digester into its leach caster. Rotating rakes feed the chips in the leach caster onto conveyor which, in turn, supplies the chip elevator. The chips are further transported by conveyors which make up a constant feed to the refiners and a chip runaround. The guillotine insures a constant level of chips on conveyor, diverting excess chips onto conveyor, thence back to the chip elevator. By having a current or load sensitive relay on the motor of conveyor, we stop and start the leach caster mechanism, thereby automatically controlling the feed of chips to the system.

The primary refiners discharge into a tank, from which the coarse pulp is



Sprout Waldron digester as installed at Sonoco Products mill.



1. Chip conveyor, 2. Silo, 3. Unloader, 4. Conveyor with weightometer, 5. Elevator, 6. Chip conveyor with magnetic pulley, 7. Chip level indicators, 8. Surge bin, 9. Conveyors, 10. Chip breakers, 11. Discharge duct, 12. Exhaust fan, 13. Pre-steam tubes, 14. Rotary valve, 15. Digester, 16. Variable drive, digester screws, 17. Discharger, 18. Recirculation, 20. Liquor dilution tank, 21. Pump, 22. Strong liquor, 23. Dilution valve, 24. Storage tank, 25. Proportioning pump, 26. Supply tank, 27. Pump, 28. Steam, 29. Leaching tower, 30. Level indicator, 31. Vent, 32. Agitator, 33. Consistency control valve, 34. Chip pump, 35. Rotoflow feeder, 36. Drainer, 37. Magneguard chute, 38. Screw press, 39. Pressed liquor tank, 40. Pressed liquor pump, 41. Run-around, 42. Uniflow feeder, 43. Refiner, 44. Stock chest, 45. Agitator, 48. White water tank, 49. Stock pump, 50. Consistency regulator, 51. Pulp to paper mill, 52. Consistency control valve, 53. Leaching tower overflow, 54. Vibrating screen, 55. Heavy liquor tank, 56. Pump to evaporators.

passed over two vacuum washers in series. Each washer is piped for two-stage washing and the pulp is washed countercurrently. After washing, the pulp goes to tank and the consistency is regulated. Final fiberizing takes place in the secondary refiners.

From the secondary refiners the pulp is pumped to the paper mill where it is blended with about five to ten per cent kraft clippings or box waste prepared in a Hydrapulper and the broke that is returned from the machine. After the machine chest the stock receives further refining in jordans before going to the machine.

New Pulp Mill

The process flow and equipment used in the new pulp mill are shown in the accompanying flow sheet. Chips are brought from the woodyard with the same conveyor system which supplied the old system and delivered to the storage silo **2.** This silo has a capacity of 45,000 cubic feet., enough for 18 hours operation at 325 tons per day rate. It is our plan to operate the woodyard one shift per day, with extra help doing the cleaning up, greasing, knife changing, etc.

In the silo we have Bindicators that indicate on the graphic panel the chip level in the silo. These Bindicators signals also indicate in the woodyard so that the operators there know the levels in the silo.

The silo discharger **3** was manufactured by Link-Belt and is controlled by the level in the chip surge bin **8**. This bin also has Bindicators that indicate chip level on the graphic panel as well as control the silo unloader.

The silo discharger feeds a belt conveyor **4** on which is mounted a weightometer that records and integrates the chip flow. This information will be useful in calculating production, yield, etc.

After the belt conveyor **4** is the chip elevator **5** which discharges to a belt conveyor has a permanent magnetic head pulley to remove metal from the chips.

As you note from the flow sheet the system is made up of two parallel lines of equipment from the chip surge bin **8** on through the pulp plant. More will be said about this when we discuss the continuous digester **15.**

The drag flight conveyors **9** are variable speed and it is here that the chip flow rate through the cooking system is set. The speed control and speed indicator of these conveyors are mounted on the graphic panel. In fact, practically all equipment can be controlled from a graphic panel. All speeds, flows and levels are recorded and indicated in the control room.

Chip Fractionating & Steaming

Below the drag flight conveyors **9** are chip fractionators **10.** These are old (the oldest) 36-1 Sprout-Waldron single disk refiners with pyramid plates. These fractionators are used to give us a more uniform chip. (We do not have chip screens in the woodyard.) Of course we expect the smaller chips to cook more quickly and more uniformly than would otherwise be the case.

Below the fractionators is a "Pants Legs" hopper **11** which is kept under a vacuum by the exhauster **12.** This is done to induce a larger flow of chips through the fractionator than would otherwise pass. As a result of the baffling in the "pants legs" there is very little chip or saw dust carry-over to the exhauster. However, the exhauster discharges to the chip elevator **5** in case there is any carry-over.

The "pants legs" are over the steaming tubes **13** and these tubes discharge to the digester rotary feed valve **14.** The inherent leak-back of vapor from the feed valve is therefore captured in the steaming tube and is utilized to bring the chips up toward the temperature in the digester. It is anticipated that extra steam will be used in the steaming tubes to further raise the temperature of the chips. Note that the steaming tubes operate at, or slightly below, atmospheric pressure rather than above, as is often the case.

Digester

The digester **15** is a very interesting innovation. It is designed to operate up to 170 p.s.i.g. There is a shell 8 feet in diameter and about 40 feet long. Inside the shell are four screw conveyors in U-shaped troughs, two above each other on either side of a vertical dividing partition, each pair being driven by a variable speed drive **16.**

The screw conveyors are 30-36 inches in diameter. Roughly speaking it is two digesters, so far as the pass through system is concerned, within one shell. The only thing that is necessarily common to both sides of the digester is the pressure. With 450 tons production, 225 on each side of the digester, there would be a retention time of about 11 minutes. We hope ultimately with 170 lb. pressure to get that production out of it. At the present time we do not have paper machine capacity to handle more than 150 tons. A machine will start up during the next twelve months that will add 175 tons totaling approximately 325 tons. So far as the liquor system of the digester is concerned, we can cook with two liquors, one on each side, or we can use a liquor common to both sides. We make our liquor in the acid plant at about 16 lb. per cubic foot. We have not yet established the ratio that we'll use on the new digester, perhaps around 3:1. The liquor is pumped over to the pulp mill and there it is diluted down to the standard strength that we plan to use. We have positive displacement proportioning pumps with which we will dilute the liquor with either white-water or fresh water. This liquor is pumped to a small tank located above the digester; from here it is pumped, with the high pressure pump, into the digester and is sprayed onto the chips through a series of nozzles running above the top screw conveyors and falls through holes in the conveyor troughs to the chips in the conveyors below. The liquor from the bottom troughs collects in the bottom of the digester and is recirculated back to the spray nozzles. We have not yet determined the amount of recirculation we will use.

The feed valves **14** are on the near end of the digester and discharge into the near end of the two top timing screws. These two top timing screws take the chips toward the far end and discharge to the timing screws below, which bring the chips back during the cooking cycle and dump them to the dischargers **17** which are under the near end.

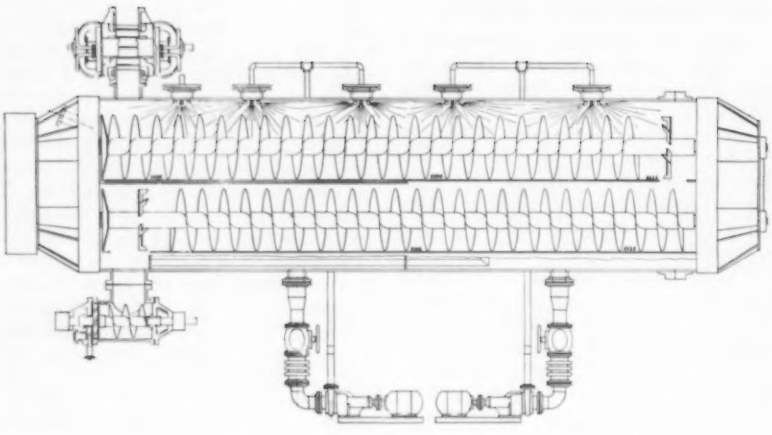
Now, when we bear in mind that all capacities or speeds from the flight conveyor **9** through the discharger **17** are variable, it is understandable that the unit is very flexible. The only thing common between the two systems is the *pressure* in the digester.

We are not set up to use different wood in the two sides, but we can feed the same wood at different rates. We can vary the treatment in the fractionator **10.** We can vary the cooking time by varying the timing screw speed **16.** We can cook with entirely different chemicals on each side of the digester by duplicating **26** the white liquor system **26 and 27.** We can further vary the system by varying the recirculation rate of cooking liquor **18.** Each white liquor system to the digester has a flow recorder controller that is supplied by the white liquor pump **27.** Also, each recirculation system **18** has its flow recorder controller.

To conserve space on the flow sheet drawings we have not shown duplicate systems beyond the digester dischargers. The systems are duplicated on through the pulp plant.

Leaching and Washing

The pulp goes from the two digester dischargers through two blow lines to the leaching towers **29.** What we call the leaching tower is a tall cylinder, with a conical shaped bottom about 10 feet in diameter by about 40 feet high. The pulp blows into the tower and



Cross section drawing of Sprout Waldron digester shows how it works.

vents through a shell where we can spray white-water to absorb the heat from the flash steam. There's a retention time in there of approximately 45 minutes, where counter current washing takes place. Expelled liquor from the screw presses and drainer is pumped into the bottom of the leaching tower, and rises counter currently through the pulp blows from the digester.

The lower cone of the leaching tower is agitated and the chip slurry is pumped from the cone at a consistency of about five per cent through a consistency regulator controlled by the agitator drive.

The pulp is diluted in the cone with white-water and is pumped from there to a run-around pipe line. This run-around feeds the pulp supsension to **35** which supply the drainers, one drainer ahead of each of the six Anderson presses **35**. The pulp then goes through the fiber press, which is a two-stage press. The first stage is a vertical screw driven with a 60 h.p. motor. The second stage is a horizontal screw with a 100 h.p. motor. Each of those motors has a 25 per cent overload capacity. The presses discharge into a run-around screw which feeds the refiners.

The extract or liquor from the drainers **36** returns to the lower cone on the leaching tower. Also returning to the lower cone is the part of the chip slurry circulated by the pump **34** and not removed from the header by the feeders **35**.

Since the digester blows at about 20 to 25 per cent consistency and the presses discharge at about 60 per cent, there is always an overflow from the leaching tower **53**. The extract from the presses **38** returns to the drainers **39 and 40** and hence to the leaching towers. However, we have a control valve **33** which is operated by the load on the agitator **32** to control the consistency in the cone of the tower by the addition of paper mill white-water.

The liquor overflow **53** from the leaching tower **29** flows by gravity to a Link-Belt screen **54**. The recovered pulp returns to the drainers **36** through a tank and pump **40.** The extract from the screen flows by gravity to a tank **55**. From this tank it is pumped **56** to the chemical recovery plant storage tank which is ahead of the evaporators.

Refining

The pulp, at a consistency of about 60 percent, from the presses **38** falls into run-around screw conveyors **41**. There are two of these, each being fed by three presses. One of these run-around screws feeds three Sprout-Waldron disk refiners **43** totaling 1450 h.p., and the other feeds five units totaling 1900 h.p. These refiners are fed by variable speed Sprout-Waldron uniflow feeders **42**. The 60 per cent pulp is diluted down to about eight per cent in and below these uniflow feeders which are located ahead of the throat screws on the refiners **43**.

The pulp from the refiners drops to chests **44** where it is further diluted to about four per cent and agitated **45**. There it is pumped **49** through a consistency regulator **50** to the paper mill **51**.

Dilution Water

The dilution for the liquor and pulp in the pulp mill is done with paper mill white-water. This white-water is pumped from the paper mill to the pulp plant white-water tank **48**. The level in the white-water tank is controlled by a valve **47.** We have plans to install white-water heaters **31**, utilizing the vapor from blow pulp. As yet these heaters have not been installed, as it is doubtful that they will be needed to maintain the desired stock temperature.

The cooking liquor is diluted with white-water in the constant displacement proportioning pumps **25.** Our liquor is manufactured at about 16 lbs. per cubic foot, and is brought over to the pulp plant at that concentration **22.** It is pumped into a tank **20** where it is diluted to a standard such as 14 lbs. per cubic foot, and then pumped **21** over to another tank **24**. After this tank it is further diluted in the proportioning pumps **25** to the concentration used in the digester. These proportioning pumps **25** pump to a tank **26** which has a level control that stops and starts the proportioning pumps **25**. This tank **26** maintains a constant head on the suction of pump **27** that supplies the white liquor to both sides of the digester.

Recovery

Our chemical recovery plant is being located east of the new power plant. This plant will recover the acetic and formic acids from pulp plant liquor

We are planning to evaporate the liquor to about 43 per cent solids, acidify and extract acetic acid with methylethyl ketone. Further on formic acid will be extracted with ethylene dichloride. After that's done, the bottoms from the extraction towers will be made up of what we call "raffinate," for want of a better name. This raffinate is very rich in salt cake, and it has some fuel value, about 5,000 Btu. per pound. That will also be at 43 per cent solids or thereabouts. We are planning to further evaporate that and dispose of all of it, if we can, on a temporary basis, to kraft mills. Since it is on a temporary basis we are not asking much for the product itself. There is a large amount of salt cake value in it and B.t.u. value.

Power

Our new power plant is interesting in that it will be equipped to burn bark and any one of the three other fuels. The throttle conditions are 1250 p.s.i.g. and 950°F. The turbine-generator unit has the following extraction points:

- Admit or extract at 400 p.s.i.g.
- Extract non-automatically at about 200 p.s.i.g.
- Extract automatically at 150 p.s.i.g.
- Extract non-automatically at about 40 p.s.i.g.
- Condenser to carry rated load.
- Generator rated 15625 kva. and 13.2 kv.

We are now operating parallel with the public utility and will continue to operate that way although our calculated heat balances indicate that we can carry our normal electric load in the colder months without condensing. We will draw a few hundred kw. from the utility.

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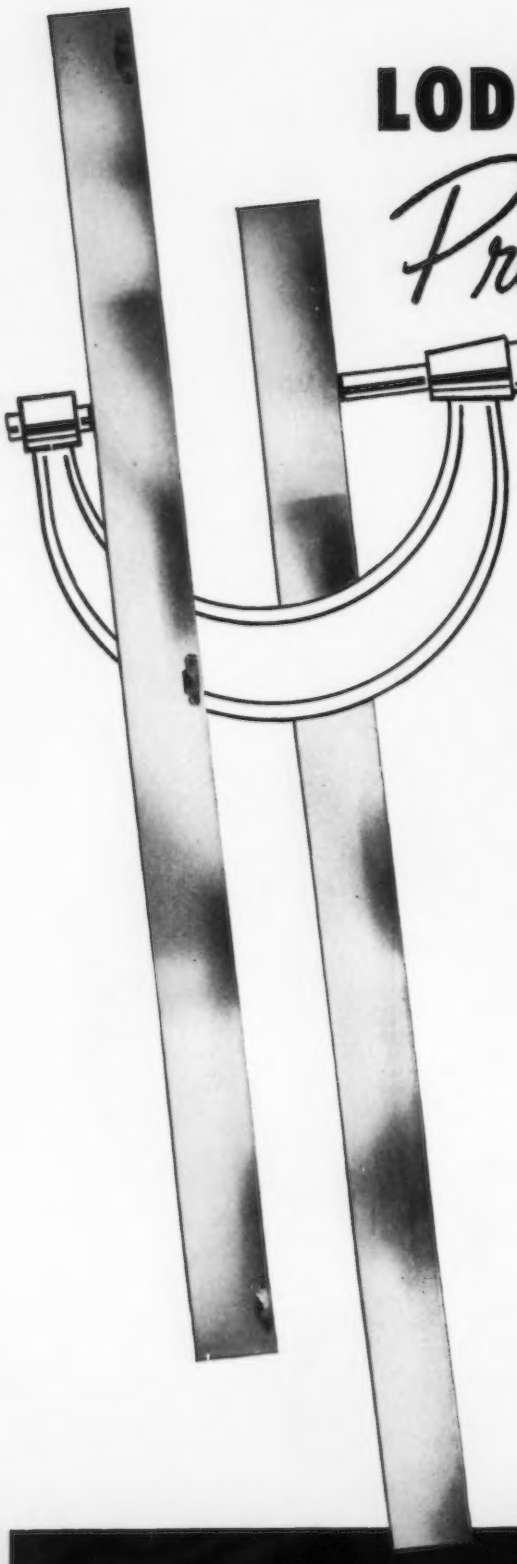

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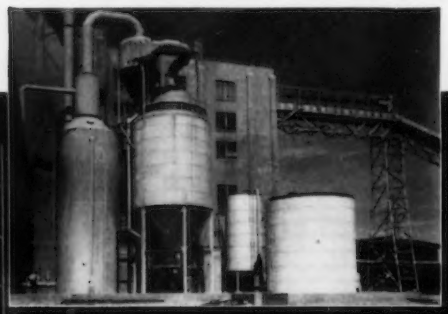

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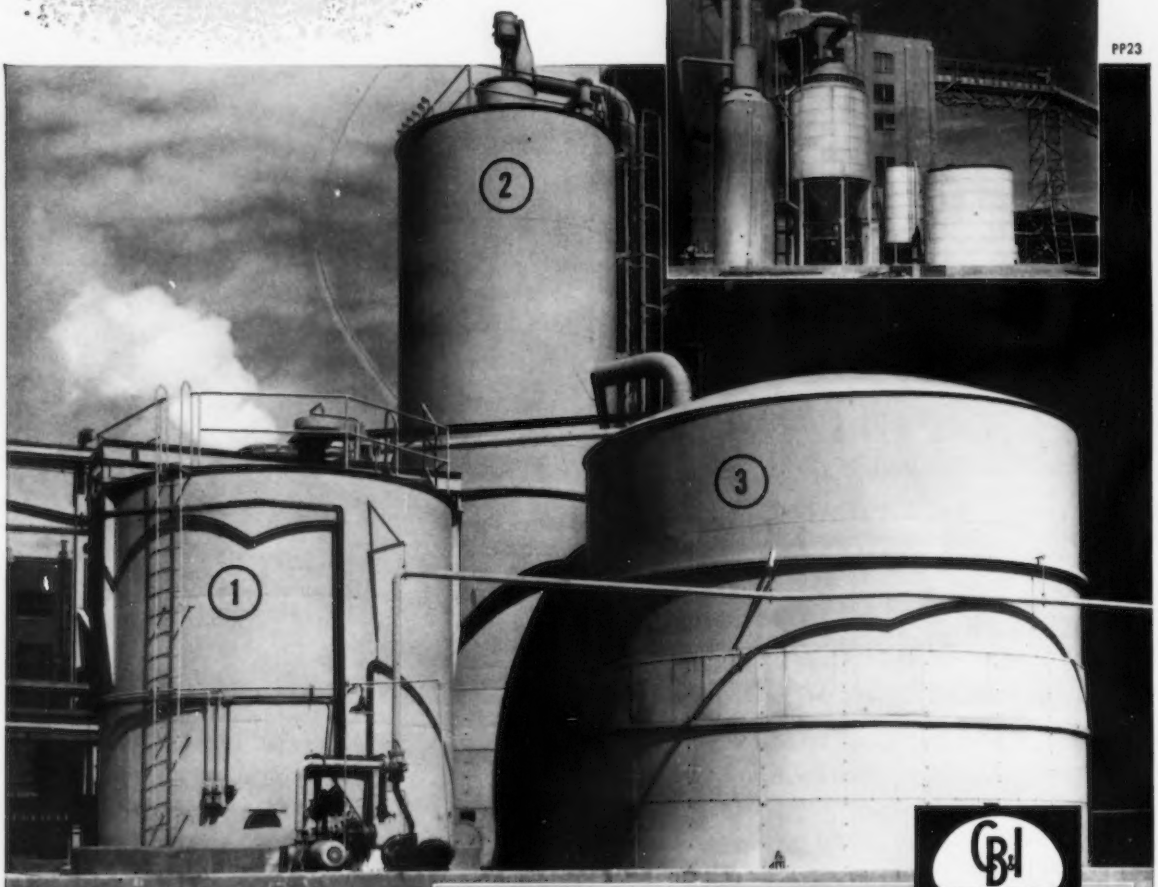

Some of the CB&I structures at this Mead mill include:

(1) 24-ft. diameter caustic liquor storage tank
(2) 15-ft. diameter by 50-foot high foam tank
(3) 26-ft. diameter black liquor storage tank

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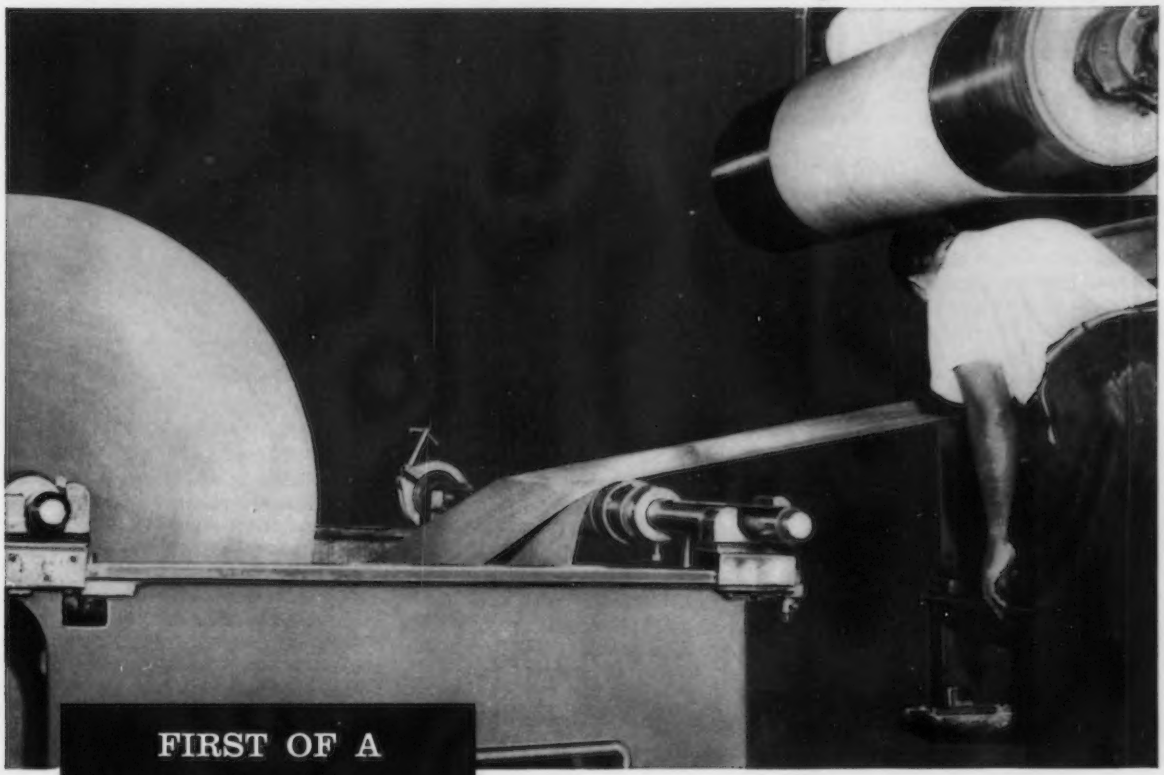

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Paper Needs of the Business Forms Industry

B. J. Staneslow

Manager, Chemical Research
Moore Business Forms, Inc.

It has been said that if you really know the use requirements of the products you make, you know the improvements your product should have. To this can be added: you also know why your product needs each improvement and can then develop it with definite objectives in mind—a "must" for the ultimate success of any development.

In the case of papers for business forms, the paper mill must be concerned with these two major use requirements—

1—The production requirements of the business forms manufacturer

2—The end use requirements of the forms user.

While reasonably close coordination has existed between the paper mill and the business forms manufacturer, it seems paper mill staffs have not been kept adequately informed of the present day rapid changes in the forms users' end use requirements.

These changes in end use requirements and methods have brought with them new production problems for the forms manufacturer principally because many of today's business forms must be fabricated with greatly increased precision, dimensionally and in many other ways.

The objective of this article is, therefore, to help acquaint the paper mills with present day requirements of business forms papers, if such papers are to permit the forms manufacturer to produce a product which will meet the present exacting and required needs of the business forms user.

Put another way, this article will attempt to show why present day papers are falling short of the new business forms needs, the thought being that, with adequate coordination between the paper mills and the forms manufacturer, seriously needed paper improvements can be effectively developed.

Business Forms Function

Manifold business forms are sets of papers, printed with a functional design, and provided with a means of multiple copy production. Most business forms require perforated lines for separating the copies after they have been produced. Some varieties of forms also require marginal or other types of punching of holes for writing machine feeding and alignment.

The function of the business form is to provide a medium for the efficient and rapid recording of information or transactions by handwriting, typewriting, or by the present day high speed automatic writing machine.

Types of Papers Generally Used

The business forms industry uses a large variety of types and grades of paper, the major one being the register bond and carbon paper tissue. Both of these are regarded as made-to-order papers which meet the specific requirements of the business forms industry. In addition, there are many others such as news, book, ledger, card, and carbonizing bond.

Why the Need for Paper Improvements

Satisfactory production and use of the business form is very much dependent upon the chemical, physical, and mechanical properties of the paper. Originally the business form was a comparatively simple product and the paper used not very important because records and transactions were written by hand. With enlarging of business operations and the concurrent development of business machines such as the typewriter and the autographic register, and the development of carbon papers for such machines, the paper had new requirements to meet.

With today's high speed automatic writing machines, business forms papers must meet still further new requirements in terms of dimensional stability and precision, surface finish and other properties for satisfactory printing, manifolding of copies, as well as more exact fabrication involving perforating, punching, fastening, and so on. Likewise, today's carbon papers require new, more rigidly controlled base sheet specifications.

Qualities and Functional Properties for Present Day Business Forms

Overall Uniformity of Paper

When it is realized that the printing press, the carbon paper coating machine, and the business writing machine have to be accurately adjusted to run each specific grade of paper, it becomes quite apparent that any variation in the paper product can create operating difficulties. The need for uniformity, therefore, in terms of such factors as basis weight, caliper, finish, strength properties, moisture content, printing and carbon paper ink and copy receptivity cannot be overemphasized.

This uniformity is also essential in every roll of paper which the industry uses, regardless of its size. Average values of tests of wide mill rolls have little significance in this case.

Importance of Moisture Control

A major requirement of the business form is that the printed design on all sheets of a form be in exact register. This is not maintained with papers of varying moisture content even though printed with high precision.

A major cause is insufficient moisture content control in the roll. For example, a roll of paper used to produce Part 1

of a form might have 4 per cent moisture content while another roll used to produce Part 2 of the same form might have 7 per cent moisture content. After precision printing, the paper of each part will give up or take up moisture in order to reach equilibrium with the surrounding atmosphere.

If this condition is midway between the two papers, the paper of Part 1 will expand while the paper of Part 2 will contract. The original dimensions of the two parts of the form are thereby changed *but in opposite directions* and register of the printed design on the form parts thrown seriously out of alignment. Thus, when these papers with altered dimensions are put through subsequent operations, problems are encountered.

It is apparent, therefore, that the moisture content of the paper in the roll has to be maintained within close tolerances so that the dimensional changes which are bound to occur with daily and seasonal moisture variations will be within the production and end use demands of the printed form.

A plus or minus ½ per cent variation in moisture content of the paper seems a reasonable tentative objective and papers maintained within these limits would be reasonably free of the operating problems described herein. Closer limits than the foregoing should be the longer range objective. This, of course, will mean a need for improvements in moisture control technology and instrumentation and the proper adaption of these improvements to the paper mill equipment and processes.

What has been said about the need for close moisture content tolerances in printing papers is equally important for the carbon paper tissue. Expansion or contraction of these papers can prevent satisfactory assembly of the resulting carbons with the printed parts of the form.

Another problem, primarily true with carbon paper tissue since wide rolls are coated, is the effect of a high moisture content. In this case, a loss of moisture resulting from passage of the paper over hot rolls and being coated with hot ink produces a significant decrease in the width of the roll which results in fewer possible cuts of a definite size than should have been expected. Waste from this cause can be very costly.

Dimensional Stability

For the printing and the use of business forms, there is a need to control the dimensions of the paper within close tolerances. The effect of moisture content variations in paper has just been described. The development of more dimensionally stable papers would be progress in the right direction provided there did not result from this development adverse properties in the business forms papers such as loss or reduction of necessary paper surfaces and operating qualities.

Dimensional stability is also very necessary to meet the functional use requirements of some products such as the tabulating card. Dimension tolerances are very narrow and are becoming increasingly so as the many new developments in new, faster, and more functionally efficient automatic writing machines are put in use.

Physical Strength

Most of the paper grades used in the business forms industry have reasonably satisfactory physical strength. The problem is the variations in these characteristics from roll to roll, and even within the roll. These variations cause costly production problems and serious difficulties in the end use of the forms produced.

Here is a typical illustration: A pressman carefully adjusts the perforator for the correct strength of the perforation on the initial roll of paper. In continuing the order, a second roll of paper is needed and this roll is significantly different in strength properties to require another adjustment of the perforator blade. Production is thereby affected.

Or, suppose the pressman assumes no variation in paper strength from one roll to the other and, therefore, makes no perforator blade adjustment while running the forms order. Then the forms user is confronted with two possible difficulties: 1) perforations in some forms are too weak and, therefore, break during the writing machine operations; 2) perforations in some of the other forms are too tough for satisfactory separation of the forms at the perforation by hand or by machine detaching.

Such difficulties are very costly to the user in both time and delayed operations and result in serious complaints to the forms manufacturer.

Improvements in Paper Surfaces

Surfaces for Printing Papers. While the printing quality of the papers used by the business forms industry is reasonably good, improvements would be helpful. Sharpness or legibility of the printed design is very necessary and satisfactory absorption of the ink desirable to permit a sufficiently heavy ink deposit for maximum contrast without offset problems. The development of a coated or treated surface which would enhance these qualities would make the appearance of the form more attractive to the forms user.

Printing paper surfaces must also have good receptivity for carbon paper copies. It is not only necessary that the surface remove the carbon paper coating completely at the points of applied writing or typing pressure but that the characters formed be sharp and legible for maximum manifolding quality.

Flat surfaces without a hard glaze plus a uniform and closed formation would seem capable of contributing equally to both the printing and the copy receiving properties.

The surface of the paper must also be satisfactory for erasure so that the retyped entry is legible and has good contrast. This quality should also be of help in preventing picking when tacky offset printing inks are used.

Surfaces for the Carbon Tissue. There seems to have been no coordinated effort by the paper mills and the business forms industry to improve the surface properties of carbon paper tissues, in particular, the one-time grades. A very desirable and helpful contribution could be made in this area.

It is recognized that carbon paper ink absorption by the carbon paper tissue (one-time) should be a surface phenomena, because a minimum of ink penetration is wanted. The main reason for any penetration is to provide for a bond between the ink film and the paper which will prevent flaking of the coating. This minimum penetration will also permit maximum release of the coating under writing or typing pressure. A treatment of the surface of the carbon paper tissue might help provide such characteristics. It could also improve the problem of pin holes in carbon paper tissue which is a very troublesome condition to the forms manufacturer as well as to the forms user.

Other Physical Properties

Caliper. A uniform caliper is necessary. Variations from specifications introduce problems in packaging of the product. A high caliper paper will increase the overall thickness or bulk of the form and the required number of sets will not fit into the carton. This is costly in production time and is undesirable by the customer since the continuous length of the forms or the number of cut forms is decreased. A low caliper paper would decrease the bulk of the product and fit the container too loosely. This might result in damage to the product.

Another factor influenced by caliper is the manifolding quality of the form. A high caliper paper would tend to produce a poorer copy result because of the added thickness of the form. A low caliper paper would improve the

manifolding of the set but very likely would not be duplicated on the next order resulting in customer's complaint that the manifolding is not up to the standards of the previous order.

In view of the seriousness of the problems created by variations in caliper, it would be highly desirable for the paper mills to control this property closely and within the limits needed for satisfactory production and end use.

Even-Sidedness. Both sides of the printing paper should have the same surface characteristics so that the printing or the carbon copy would be acceptable if done on either side. Although it is normal to make use of the top side of the paper, there are times when the wire side has to be used to eliminate some production operating problem.

Condition of the Paper Roll

For satisfactory production and end use of its products, the business forms industry must have the physical condition of the paper roll as near perfect as possible. Conditions of the roll which cause costly business forms production problems and eventually serious difficulties for the forms user can be described as follows.

Imperfections in the Paper. Slime and starch holes, dirt, and other imperfections all contribute to lowered forms production efficiency and end use difficulties. When such defects are noted in production, they are removed. Since such action is costly and results in a spliced form, it would be a worthwhile effort on the part of the paper mills if such defects could be eliminated in the manufacture of the paper.

In cases where these imperfections are not observed due to high speed forms production, serious problems arise in the end use of the product. Inmporant records will not be reproduced in the area of the slime or starch hole or they will be illegible if occurring over other imperfections. The loss of important information could result in this case as well as great inconvenience to the forms user.

Holes in the paper are also apt to cause web break which is costly because of lost production and waste. Similarly, cuts and hairs on the edges of the paper are often the cause of web breaks.

Splices. Forms production problems can be avoided with paper rolls free of splices. Since it is recognized that the paper mill may not be able to manufacture roll after roll of paper without a break, the business forms industry must have well-made splices. These will go through the printing press without difficulty unless the perforator blade strikes it, in which case the teeth of the blade will be damaged and the perforator will have to be replaced.

The forms user may object to the splice if its position in the set interferes with the production of a legible copy. He will also have to discard a set if the appearance of the spliced sheet is unsightly or is on an important part of the form such as the purchase order or a check voucher.

The poorly made splice gives much more serious trouble, especially if its position in the paper roll is not clearly identified. It can be the cause of a web break in the press, damage to the printing plates and the blanket, and, of course, wasted paper and lost production.

At the carbon paper coater, such a splice break means a costly, time-consuming clean up of the machine. There would also be lost production time and wasted paper.

The paper mill can make an important contribution by: a) keeping splices down to the very minimum, and when they cannot be avoided, by making them carefully and identifying them; b) searching for improved splicing materials and techniques.

Accurate Slitting. Accurate slitting of the roll is vital to business forms production. A tolerance of a plus or minus 1/64-inch of the specified width on slit rolls would permit the manufacture of precision products without side trim. Waste would be materially reduced and the forms would also benefit in terms of lower prices.

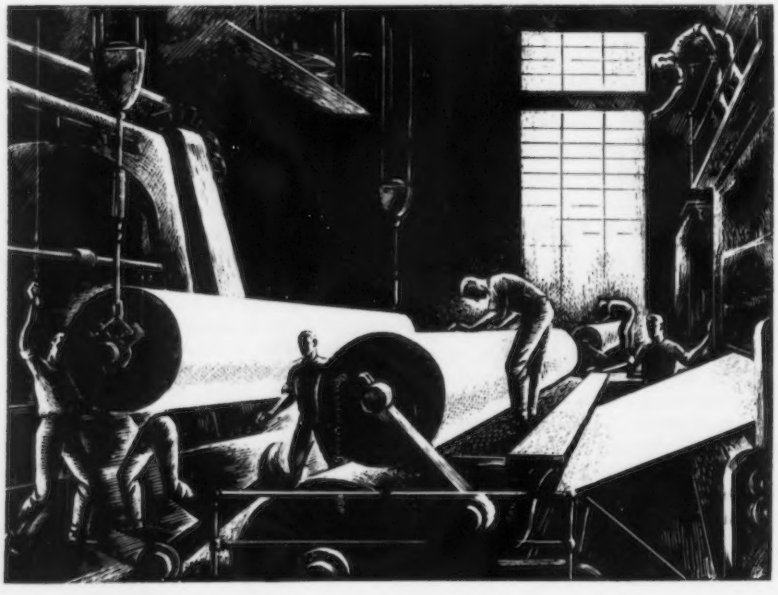
Slitter Dust. Dull knives cause slitter dust on the sides of the roll as well as on the surface of the paper. This dust causes considerable forms production troubles because the dust works itself into the printing ink fountain or into the carbon paper ink fountain. In the case of the former, the printing quality is reduced and there is lost down time as well as paper and ink waste in correcting the trouble.

In the case of the coating of carbon papers, slitter dust causes the ink to become too thick for satisfactory coating operation in addition to producing heavy and unsatisfactory deposits. Such improperly coated carbon paper must be discarded and the (slitter dust) thickened ink replaced with new ink.

Winding. Tight, uniform wound rolls is very essential. The rolls must also be free of flat spots, soft spots and edges, as well as stretched or baggy sections. Business forms production equipment require a uniformly maintained even draw on the paper and this is not possible if the roll has any of the foregoing shortcomings. When present, they will cause tension and printing register problems which result in unnecessary waste, lost production time, and an end product of inferior quality.

* * * *

In summarizing the subject matter of this article, new end uses for business forms with their more exacting requirements make it necessary for paper to be improved in order to meet these demands. There is no reason why this cannot be accomplished under the proper coordinated efforts of the paper mills and the business forms industry to their mutual benefit.



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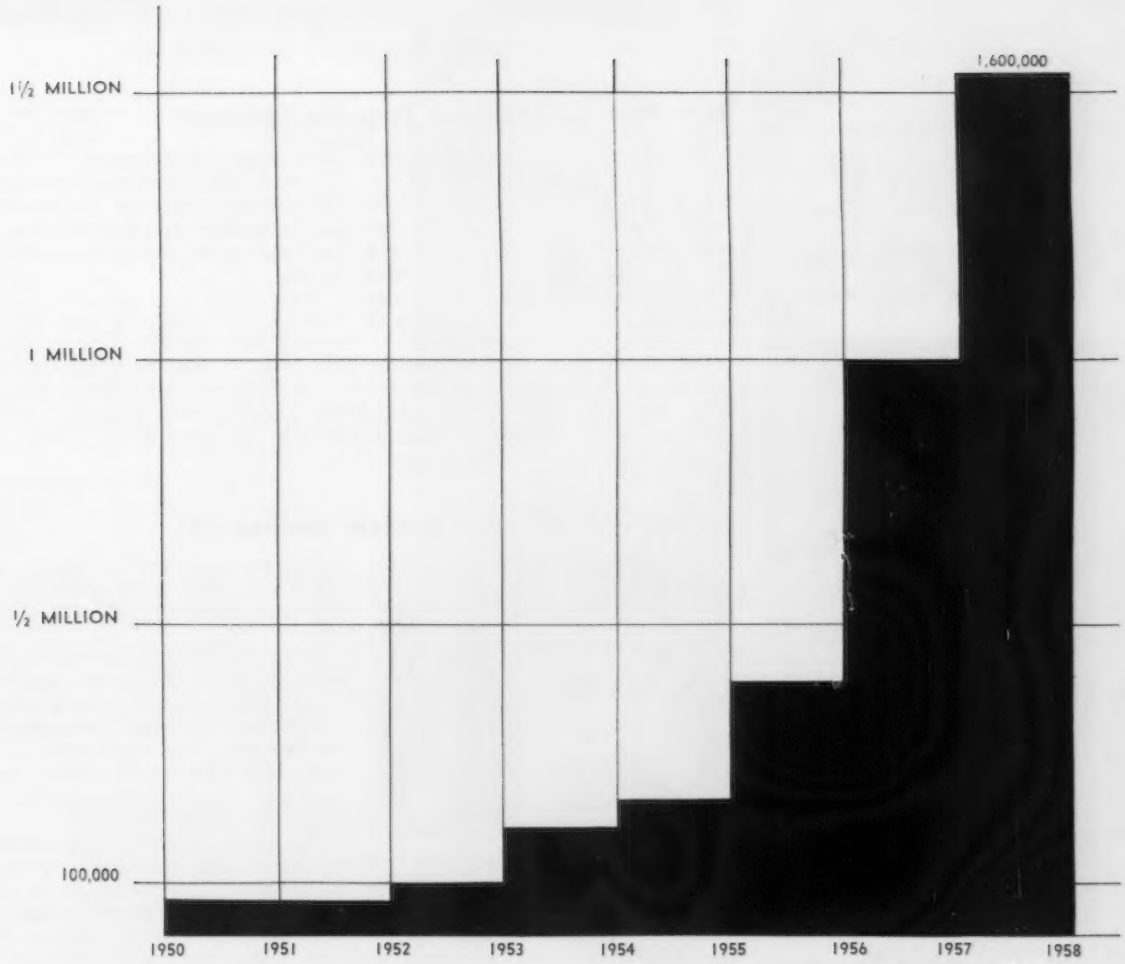

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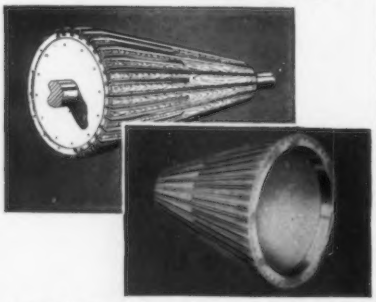

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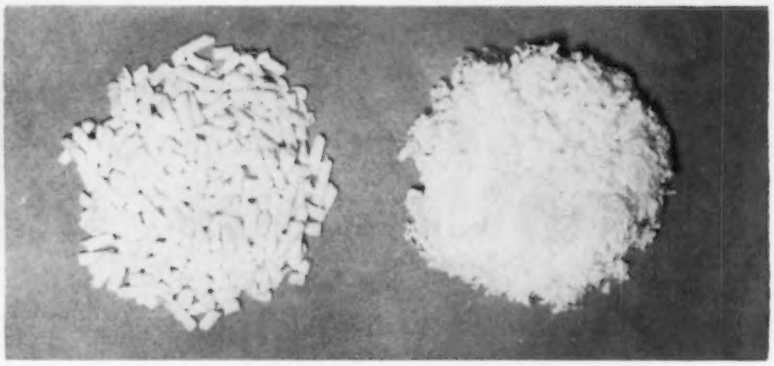


Pelleted bleached kraft pulp at left, ordinary pressed pulp at right.

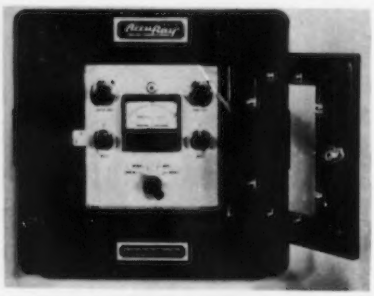
New Process Prepares Pulp for Shipment

The successful pelleting of wood pulp and the development of a complete system for pelleting, denodulizing, drying and handling pulp pneumatically has been announced by Sprout, Waldron & Co. Inc. According to the Pulp and Paper Division, the new system may mean tremendous savings in terms of labor, shipping and handling costs.

The pelleted pulp is said to have approximately 50 per cent more fiber per cubic foot than baled pressed pulp, which means that shipping volume is reduced by one-third and baling operations completely eliminated. An analysis made for a leading eastern paper manufacturer indicated the possibility of saving more than $100,000 per year in freight alone and an equal amount in labor.

Tests which have been run to date indicate that pelletizing does not adversely affect the physical properties of the pulp. In fact, there is evidence, to make us believe that pelleting improves the quality of some pulps, and make it possible to secure better quality control.

Density Measurement System Announced



An AccuRay density system which measures and/or controls fluid density, specific gravity, per cent solids, or related quantity has been announced by Industrial Nucleonics Corp., 1205 Chesapeake Ave., Columbus, Ohio. This new density unit is applicable to liquids, slurries, and naked, granulated, powdered, or other divided solids. Based on the principles of gamma ray transmission from a radioisotope, the system makes no physical contact with the flowing material. Measurements are also independent of flow rate and pressure.

Depending upon the process and material measured, long term accuracies of $\pm.001$ to $\pm.003$ specific gravity are readily obtainable. The system can be furnished with sensitivities to the order of 0.0001 specific gravity. Built-in standardizing circuits maintain accuracy and calibration.

The measuring head of the AccuRay Density System is designed with maximum stability and ruggedness to withstand shock and vibration under the most adverse industrial conditions. Pipe sizes from three-inch to eight-inch are standard; other sizes are available on special order. The power-supply-amplifier instrument may be located hundreds of feet from measuring head. Mounted separately is any one of several standard recorders that can be used with the AccuRay System.

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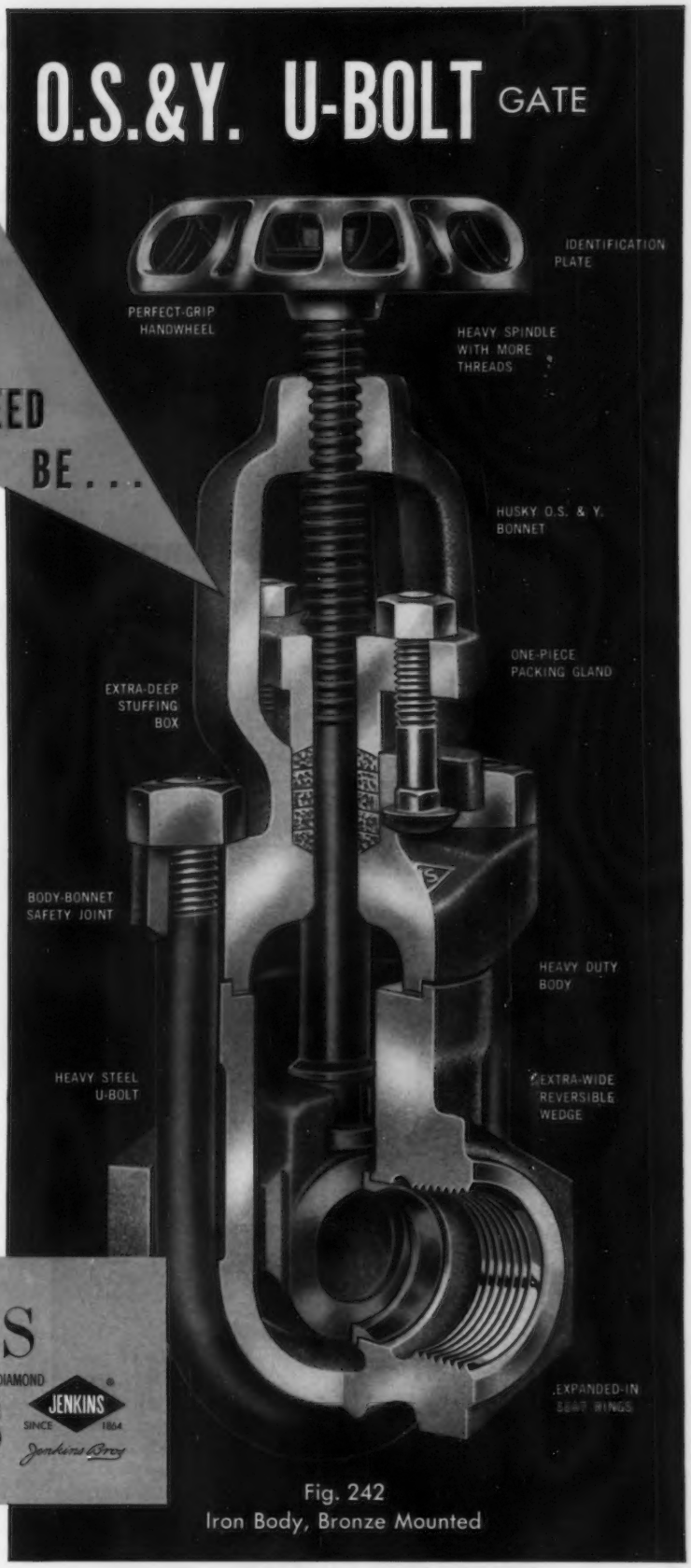

Fig. 242
Iron Body, Bronze Mounted

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A series of tested chemical coatings for industry combining a wide variety of protective properties have been produced under the trade name Koropon by United Wallpaper Inc., Chicago-based manufacturer of coatings and chemicals.

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Koropons are available in three basic types: cold curing catalyzed, air drying, and heat curing or baking. The catalyzed finishes resist the most extreme corrosive conditions found in chemical plants, pipe lines, and pulp and paper mills. The air-drying finishes offer excellent outdoor durability and protection in moderately corrosive atmosphere. Resistant to mild alkalies and detergents, they withstand repeated scrubbing without losing their gloss. They are said to be ideal for interior maintenance finishes in food processing plants, breweries, paper and textile mills.

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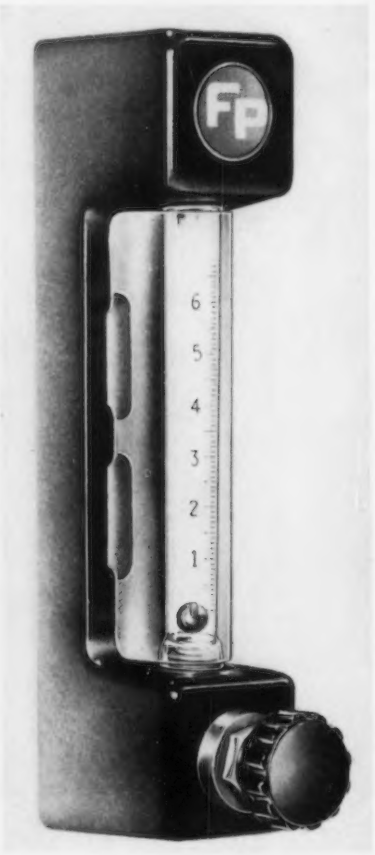

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For more information, write Fischer & Porter Co., 578 Jacksonville Road, Hatboro, Pa.

(Continued on Page 54)

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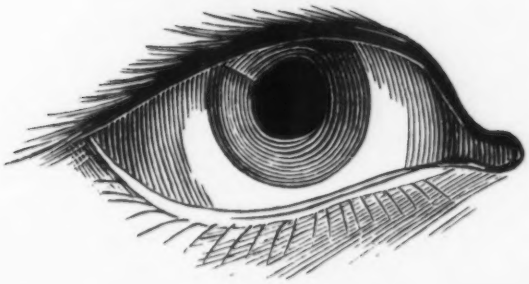

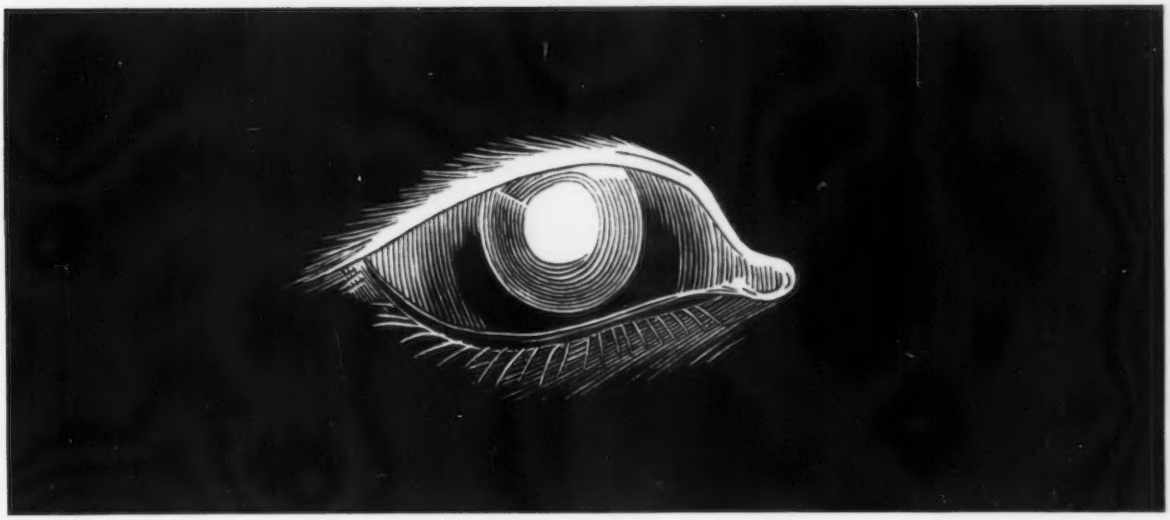

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TAKE A LOOK AT THE MAP SHOWN BELOW

Here you will see the area where the pulp and paper industry has shown such extraordinary growth in the past two decades. Within that time billions have been invested by pulp and paper companies in plants and timber lands in the Seaboard Southeast.

There are excellent reasons for this. The Southeast is one of the finest timber areas in the world. The potential for increased timber growing is excellent. An abundance of water for processing, plus favorable operating conditions and nearby markets, completes the picture.

The pulp and paper industry is not through growing. Future demands for pulp and paper will necessitate the building of more mills in the years ahead.

For information on desirable locations for pulp and paper mills, converter plants or distribution warehouses, ask an organization which has successfully specialized in pulp and paper locations for more than thirty years.

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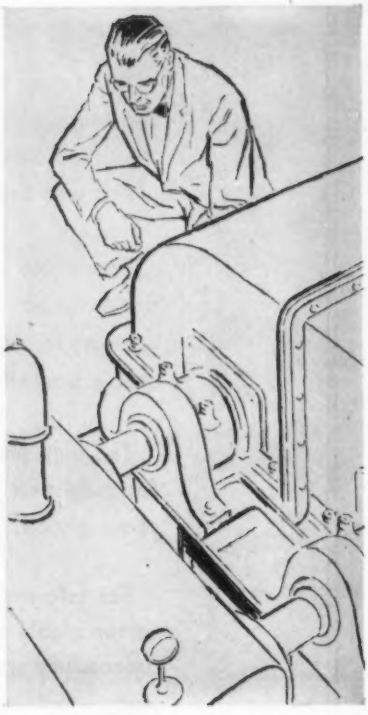
2. Lab Trials

With your approval, tests are carried out in your own lab. Based on these lab tests, a detailed report is presented. This report covers complete plans for a mill trial and installation of equipment. Many mills go into production from this step.



3. Mill Trial

Du Pont technical men work with your men to prove out the results of lab tests on a production scale. This step points up the improvement in pulp brightness you can gain by using peroxide together with the latest bleaching methods.

Du Pont's 6-Step Service Plan can help in bleaching groundwood, chip mechanical, kraft, soda, sulfite and recovered pulps.

The Plan offers you the chance to improve product quality by increasing your pulp brightness. It's extremely flexible . . . some of the steps can be eliminated, depending on the situation at your plant.

Du Pont's 6-Step Service Plan is conducted by experienced technical people. They're fully trained and backed by Du Pont research and development laboratories. The recommendations of these men can help your operation, whatever type of pulp you bleach.

Du Pont's 6-Step Service Plan is available to you without cost or obligation. For more information or help with your pulp bleaching program just write us on your letterhead or call Du Pont direct.

FIRST WITH PROCESSES
AND SERVICES FOR PEROXIDE BLEACHING

brighter pulp and paper

4. Bleachery Planning

Du Pont technical men consult with your engineering personnel on the design and construction of the bleachery. In cooperation with your equipment manufacturer, they advise on the size and type of equipment to be installed.

5. Bleachery Start-Up

During the initial start-up, Du Pont technical men assist and advise your personnel on efficient bleachery operations. In-plant training helps bring your key men up to date on new bleachery operations and helps in achieving maximum results.

6. Continuing Service

After your new bleachery is in operation, they continue to be available for consultation, technical assistance and help on new developments. Experienced Du Pont technical men are conveniently located in all of the major bleaching centers.

DU PONT
REG. U. S. PAT. OFF.

PEROXIDES

ALBONE® hydrogen peroxide • **SOLOZONE**® sodium peroxide

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Portland, CApitol 7-1281

SOUTHERN AREA
Charlotte, FRanklin 5-5561

. . . or call
Wilmington, Delaware • OLympia 4-5121—Ext. 4698

(Continued from page 50)

Small Magnetic Flow Meter

Previously limited to a minimum line size of 1-inch, a magnetic flow meter, manufactured by Foxboro Co. is now available for ½-inch flow lines. It is reported to be particularly useful in ratio flow control systems where small flows are ratioed to larger ones. The meter offers over-all accuracy of one per cent of full scale throughout the entire scale, no restriction of flow, linear flow readings, and performance unaffected by pressure, viscosity, density or changes in conductivity of the flowing liquid.

The transmitter unit consists of a Teflon-insulated nonmagnetic flow tube containing flush-mounted metallic electrodes and surrounded by an a.c. electromagnet. When a conductive liquid passes through the tube, an alternating voltage is set up between the electrodes which varies linearly in proportion to the volume rate of flow. Lead wires from the electrodes transmit this voltage output to a Foxboro Dynalog recorder, producing a chart record in appropriate units of flow. Flow rates as low as three g.p.m. can be measured by the new instrument.

Complete information is available on request from Foxboro Co., Foxboro, Mass.

Masonite Tech. Dir.

Robert M. Boehm, formerly director of research, has been appointed technical director of Masonite Corp. His Headquarters are at Masonite's main plant at Laurel, Miss.

Nothing New Under Sun

Dear Mr. Evans:

We were especially interested by the note "Japan to make Synthetic Fiber Paper," which appeared on page 14 of your issue of January 20. Do you have any more detailed information available on this development, or can you tell us whom we might contact for further facts?

I should like to take this opportunity to commend the high quality of the recent article by the men from the Institute of Paper Chemistry on other possible sources of fiber for the industry. In this connection you may be interested in some material I found in old files from the year 1918. Some taxpayer suggested that the horse droppings collected from the streets of our major cities could be used as a source of already digested fiber to meet the shortage at that time. The then chief of the Paper Section, Mr. F. C. Clark, replied seriously, perhaps with tongue in cheek, that the cost of separating the non-fibrous constituents would be excessive and the odor problem might be even worse than in kraft mills!

Very truly yours,
Robert B. Hobbs
Chief, Paper Section
National Bureau of Standards
U.S. Department of Commerce

OBITUARIES

William K. Brown, 98, former president of John Leggett & Son, paper box manufacturer in Troy, N. Y., died January 24. A businessman for more than 60 years, he had been a director and officer of several paper mills in the Troy area.

Patrick E. Sullivan, 81, a senior director of the Missisquoi Corp., Sheldon Springs, Vt. manufacturer of paperboard specialties, died January 31.

Charles K. Blandin, 85, president and owner of Blandin Paper Co., and a former publisher of the St. Paul Dispatch and Pioneer Press, died at his home in Grand Rapids, February 9.

Mr. Blandin negotiated purchase of the paper mill in Grand Rapids in 1916 to supply the dailies with newsprint. When he sold the papers in 1927, he retained the paper firm that now bears his name.

During the Depression, Mr. Blandin invested millions of dollars to expand and modernize the mills, which were later converted from production of newsprint to ground wood printing paper.

Russell H. Dunham, first president and chairman of the board of Hercules Powder Co., died suddenly at his home in Wilmington, Del., shortly before midnight on February 1 following a cerebral hemorrhage.

Mr. Dunham was active in company affairs for 44 years. He retired as president of Hercules in 1939, remaining as chairman of the board of directors until June 1944. He continued as chairman of the company's finance committee until 1952, and remained as a director of the company until March 1956.

Alvin H. Johnson & Co.
INCORPORATED
Consulting and Designing Paper Mill Engineers
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PAPER MILL DESIGN PROCESS ENGINEERING POWER PLANTS
STRUCTURAL AND ARCHITECTURAL DESIGN
REPORTS APPRAISALS ESTIMATES AND SURVEYS

NEWS OF SUPPLIERS

Allan Hyer
(Black-Clawson)

Ed Larson
(J. Bolton & Sons)

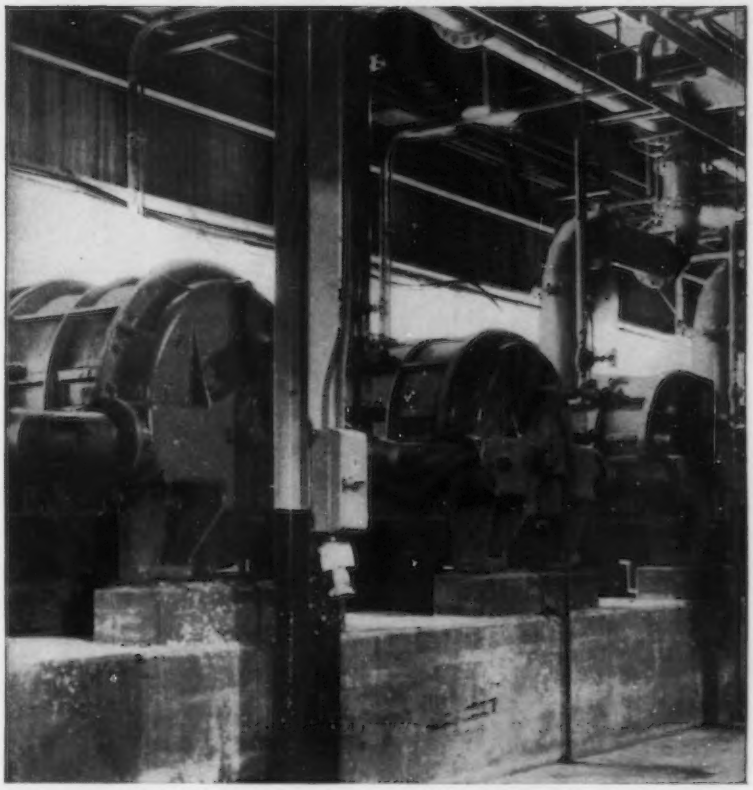
Black-Clawson Co. has announced that Allan Hyer, vice president, has retired from active service with the firm. Following some 20 years as a sales representative Mr. Hyer became sales manager in 1938 and vice president in 1945, a post which he held until 1947, except for a leave of absence during World War II. In this period he served as a dollar-a-year man with the War Production Board of the U. S. Government. In 1947 Mr. Hyer left Black-Clawson to become vice president and sales manager of Bagley & Sewall Co., Watertown, N. Y. In 1954 when Black-Clawson acquired Bagley & Sewall, Mr. Hyer rejoined B-C as vice president.

John W. Bolton & Sons Inc. and Emerson Manufacturing Co. Division is paying tribute to Oscar "Ed" Larson, manager of its western sales region who recently passed his 75th birthday. Prior to joining Bolton-Emerson, Mr. Larson, an engineer, was vice president and partner with Walter Hermann in the Hermann Manufacturing Co., Lancaster, Ohio. He came to Bolton in 1928 as shop manager, and has served in the capacities of chief engineer, production manager and sales and service manager.

Stadler Hurter International Ltd. announce that they will be represented in Continental Europe—with the exception of the Scandinavian countries—by the French consulting firm of Serete, 164 Rue de Rivoli, Paris.

Under the new agreement Stadler Hurter International Ltd. will furnish process, layout and pulp and paper mill design know-how to European clients, and Serete will furnish civil and structural engineering, steam and power plant design and detailed mechanical design service for the pulp and paper industry, under the expervision of Stadler Hurter International Ltd.

What, actually, do Vacuum Pumps on paper machines handle?



Paper mill engineers know that it is actually a mixture of air and water vapor, but the custom of rating vacuum pumps in terms of air capacity alone causes this important fact to be frequently overlooked.

The presence of this water vapor causes a considerable reduction of the effective air handling capacity of any vacuum pump except the Nash. In the Nash Vacuum Pump the bulk of this water vapor is effectively condensed, due to the Nash operating principle. The air handling capacity of the Nash is therefore not reduced.

That is one of the reasons why Nash Vacuum Pumps are standard in over a thousand leading Paper Mills.

NASH ENGINEERING COMPANY

443 WILSON ROAD, SO. NORWALK, CONN.

Calkin & Bayley Inc. has elected Carl Magnus vice president in charge of pulp and paper mill operations. John L. Parsons, who has been associated with Calkin & Bayley since its inception, becomes vice president in charge of pulp and paper research and development.

Roots-Connersville Blower, division of Dresser Industries Inc., has just completed a major expansion on its main plant. The new integrated manufacturing department, occupying 40,000 sq. ft., will be devoted exclusively to the production of type AF rotary positive blowers, type XA rotary positive gas pumps and rotary positive displacement gas meters.

CHAS. T. MAIN, INC.
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Process Studies, Design, Specifications and Construction Supervision
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W. T. Crannell (Patton Mfg.)

C. E. Hill (Patton Mfg.)

Patton Manufacturing Co., paper machinery builders of Springfield, Ohio, has announced that Wayne T. Crannell, until now sales manager of Patton's paper mill division, has been named general manager of the paper mill division. In his new position Mr. Crannell will have overall responsibility for Patton's paper mill division, including all engineering, sales and development work.

Charles E. Hill has been named sales engineer at Patton. Until now he has served as chief engineer but as a result of his recent request to transfer to sales he will now represent the company in the field. Mr. Hill will continue to function in engineering as a consultant on major engineering problems.

L. Bigler (Griffith Rubber)

T. VanRyke (Griffith Rubber)

M. R. Helser (Griffith Rubber)

Griffith Rubber Mills has appointed Larry Bigler vice president in charge of sales of the Portland, Ore. firm. Appointment of two new members of the firm's Portland sales staff has also been confirmed.

Mr. Bigler will be in charge of sales for the Portland facilities, its subsidiaries in Seattle, and its affiliate in British Columbia.

Appointment of Ted VanRyke and Morris R. Helser as sales engineers on the firm's protective coatings and linings division in Portland were also confirmed.

Yale & Towne Manufacturing Co. has promoted Louis W. Jander from eastern regional sales manager to assistant general sales manager of its Yale Material Handling Division. He will assist in the supervision of the sale of Yales's line of industrial lift trucks. Carl O. Hedner, also an assistant general sales manager of the division, will supervise Yale hand and electric hoist sales.

Castle & Overton Inc. has elected Timothy M. Overton as a vice president.

W. H. Houff (Huyck & Sons)

R. L. Schuerman (A. E. Staley)

Huyck Felt Co., Division of F. C. Huyck & Sons, announces the promotion of William H. Houff to assistant director of chemical research.

Dr. Houff, who received his Ph.D. from Michigan State University, has served Huyck for three years in the chemical research department. He has worked on new felt treatments and the chromatographic method for detection of chemical damage in felts.

A. E. Staley Manufacturing Co., Decatur, Ill. has promoted Robert L. Schuerman from assistant manager of industrial sales to manager of a newly-organized sales department serving the paper and related industries. He has been assistant manager in charge of paper and corrugating industry sales since 1955. He has been with Staley for 12 years, starting as a research assistant in the standards department, the past eight years in industrial sales.

Cameron Machine Co., manufacturers of slitting and roll winding equipment, have completed their move from Brooklyn, N. Y. to Dover, N. J. The move, started in late November, was made over an extended time period to avoid any interruption in production.

The new plant and office, with over 93,000 square feet of floor space, is located on a 25 acre site, allowing room for further expansion. The plant, a single level building, has a high center bay served by four 10-ton cranes.

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U. F. Concentrate-85 contains 85% active raw materials—59% formaldehyde, 26% urea—and only 15% water. This high solids content enables you to charge more formaldehyde and urea into each kettle. You can increase plant capacity, using existing facilities. Write for your free copy of the new 40-page booklet on U. F. Concentrate-85 properties, applications—and economies.

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PIONEER PAPER STOCK COMPANY

graders and packers of waste paper

Colton Chemical Co., a division of Air Reduction Co. Inc., Cleveland, Ohio, has just completed an expansion of production facilities at its Cleveland plant. Increased plant capacities provide for the manufacture of Flexbond copolymer emulsions previously made only at the Elkton, Md., plant. The stepped-up facilities in Colton's Elkton, Md. plant, which will be completed shortly, will make possible the increased production of Vinac emulsions widely employed in adhesives, textiles, paper and for other uses.

H. Waterbury and Sons Co. has appointed Dr. Veeriah Kota director of research. Dr. Kota will be in charge of laboratory activities directed toward improving the serviceability of felts by chemical treatment, and the development of new organic components which will improve strength and dimensional stability. Plans are being made to expand the firm's laboratory facilities for research, development and testing.

Dr. Kota studied physical-organic chemistry at Osmania University, Hyderabad, India and received his Ph.D. for research in photochemistry.

Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures

(Production as percent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

1958	Jan. 4 75.5	Jan. 11 88.7	Jan. 18 89.1	Jan. 25 89.1r	Feb. 1 83.9
1957	Jan. 5 85.4	Jan. 12 96.5	Jan. 19 97.0	Jan. 26 97.9	Feb. 2 96.5

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1958	---	---	---	---	---	---	---	---	---	---	---	---	---
1957	94.2	97.0	97.1	94.0	94.6	93.3	75.6	90.7	86.0	93.0	90.7	81.4‡	90.9

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1951	1952	1953	1954	1955	1956	1957	1958
Year to Date	99.5	97.6	95.0	94.2	95.0	97.9	94.0	85.3
Year Average	98.0	88.6	92.3	91.6	94.0	97.9	90.9	

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available.

PAPERBOARD OPERATING RATIOS†—National Paperboard Ass'n.

COMPARATIVE WEEKLY SUMMARIES

1958	Jan. 4 51	Jan. 11 88	Jan. 18 90	Jan. 25 87	Feb. 1 82
1957	Jan. 5 75	Jan. 12 97	Jan. 19 95	Jan. 26 96	Feb. 2 94

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1958	---	---	---	---	---	---	---	---	---	---	---	---	---
1957	91	94	94	92	93	91	72	94	91	97	92	79	90

† *Percents of operation based on "Inch-Hours" reported on a 6-day basis.*

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	THIS WEEK ENDING Feb. 1, 1958 82%	LAST WEEK ENDING Jan. 25, 1958 87%	CUMULATIVE TO DATE Jan. 1 to Feb. 1, 1958 84%
	Tons	*Tons*	*Tons*
Total Production	244,049	266,581	1,120,810
Liner	70,958	84,316	356,775
Corrugating Material	35,101	37,344	169,434
Chip & Filler Board	3,367	4,355	16,297
Total Container Board	109,426	126,015	542,506
Folding	55,245	56,799	224,087
Set-Up	10,381	11,110	43,448
Special Food Board	25,229	23,887	100,385
Other	43,768	48,770	210,384
Total Boxboard	134,623	140,566	578,304
Total Orders	*Tons*	*Tons*	
Received	241,750	236,717	
Unfilled End of Week	340,841	348,266	

Cady
UNIFORM PRESSURE
Burst Strength Tester

For Papers or Boards

This instrument meets ASTM and TAPPI standards; also CCC Rule 41 (Cady or Mullen Test), with a record of more than 30 years service in the paper and board industry. Uniform pressure during 12 second cycle assures uniform test on papers or boards. Pressure registers in pounds per square inch on direct reading dial and remains at reading until next test is stated. Write for complete brochure describing operation in detail.

Burst Testers • Micrometers
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MANUFACTURERS
676 North Harlem Ave., River Forest, Illinois

The old hands all use Kidder Slitters

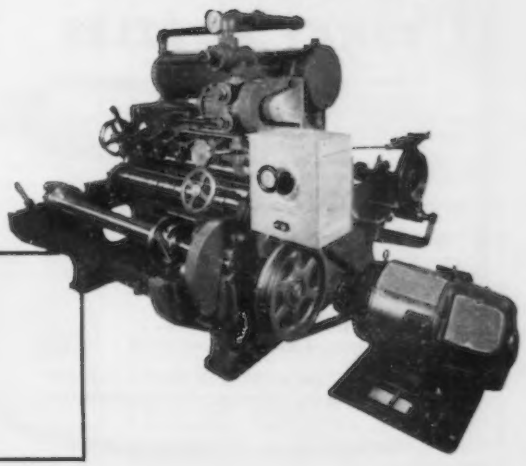
Just entering the expanding punch card business?

Kidder offers you two accurate slitters of the highest quality you can get — one for high production slitting of card stock, the other for regular.

The heavy-duty, high-production, 2500 foot-per-minute slitter is a respected veteran in the punch card field. The regular-duty, lower-cost, 1500-2000 foot-per-minute slitter is a reliable, proven performer.

Both are accurate to plus or minus one one-thousandth of an inch (0.001″), holding your slitting to metal machining tolerances. Both use the shear-cut principle that results in completely severed webs, smooth edges, and *No Dust*.

For detailed specifications, contact KIDDER PRESS COMPANY, INC., Dover, N. H. or Special Representatives, the Gibbs-Brower Company, Inc., 10 Depot Plaza, White Plains, N. Y., and 400 Washington Bldg., Madison 3, Wis.; West Coast Representative, Bojanower Machinery Service Corporation, 5270 East Washington Blvd., Los Angeles 22, Calif.



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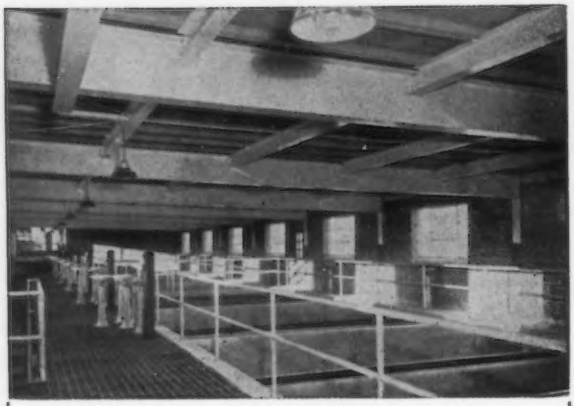

Concrete Gravity Air-Water-Wash type water Filtration Plant producing, at low cost, water with turbidity 0, color under 5 and iron 0.05 p.p.m. Fe.

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Westvaco manufactures a wide range of high quality paper products—from fine printing to rugged converting papers. All of these papers are made from virgin chemical pulps to precise standards of uniformity and quality—Westvaco's guarantee of top performance.

Printing Papers . . . Coated and uncoated letterpress, coated and uncoated offset, and gravure.

Business Papers . . . Bond, mimeo, duplicator, ledger.

Bristols . . . Index, post card.

Converting Papers . . . Label, tablet, envelope, lining, tabulating card, coating raw stock.

Bleached Boards . . . Cup, coated and uncoated carton boards, converting and barrier boards, file folder and tag stock.

Kraft Papers . . . Bag, multi-wall sack, envelope, asphalting, gumming, interleaving, waxing.

Containerboard . . . Linerboard and corrugating medium.

Market Pulp . . . Bleached and unbleached sulphate.

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Whether it's used on aisles, ramps, platforms, stairs or entire floor areas, USS Multigrip Floor Plate's evenly-spaced, flat-topped risers provide non-slip traction to feet and wheels. It won't chip, crack or splinter and can take the extreme punishment of factory service for *years* with almost no sign of wear. Multigrip can't soak up grease or oil, and a hose or broom keeps it clean. You can shape or form Multigrip where necessary. Multigrip is available in large plates, eliminating installation waste. Make sure all your heavy traffic areas and danger spots are safe-treaded with Multigrip Floor Plate.

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Top mills, converters, and jobbers from Coast to Coast badly need qualified men at every level. Choice spots open in pulp, board, coarse, fine, folding, corrugated multi-wall bags, transparent packaging and paper specialties of all kinds.

I am a paper man myself. If your record of performance entitles you to increased responsibility and greater potential, I can and will help you to attain it. You may contact us in absolute confidence.

GEO. M. SUNDAY & ASSOC.

Personnel Consultants to the Paper Industry
6 E. Monroe, Chicago AN 3-1970 TF

WANTED

ASSISTANT KRAFT MILL SUPERINTENDENT

Integrated mill in Northeast requires technically trained man, preferably in his thirties, with Kraft experience to assist in start-up and operation of modern, bleached sulphate mill now nearing completion. Right man will find excellent opportunity for advancement to Mill Superintendent within reasonable time.

Address Box 58-8 care Paper Trade Journal. M-3

PAPER CONVERTING MACHINERY DESIGNER

Wanted by manufacturer of paper and film bag machinery and printing presses.

Located in pleasant New Jersey community.

Degree not necessary—only the ability and practical background for independent design of converting machinery.

Excellent opportunity for capable man. Salary open.

Please send resume of experience. Box 58-13 care Paper Trade Journal. TF

Paper Mill Superintendent or Paper Mill Manager

Capable of assuming full responsibility together with adequate authority for the operation of a 3 machine tissue mill operating over speed ranges of 1000-2000 FPM.

Must be familiar with the engineering fundamentals of machinery for production of high speed dry crepe as well as good foundation in the maintenance of such equipment. Salary open. Address Box 58-28 care Paper Trade Journal. TF

Help Wanted

WANTED
CONSULTING ENGINEER

Experienced In Low Density Papers

Our client, a well known and highly regarded pulp mill in the South, has engaged us to help locate a suitably quaified Consulting Engineer to assist in the selection, purchase and installation of a used Fourdrinier and subsidiary equipment to commence manufacture of low density papers such as filter, absorbent, impregnating, etc. Actual experience in these or similar grades a must.

Financial arrangements will be liberal and are subject to negotiation on a per diem, weekly or project basis. Contact us for confidential details.

GEO. M. SUNDAY & ASSOC.
Paper Industry Consultants
6 E. Monroe Chicago AN 3-1970
F-24

Personnel Service Associates
H. M. Grasselt, Mgr.
115 State St., Springfield 3, Mass.
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A Placement Service designed to aid Employers and Employes in the Pulp, Paper, Converting and allied industries.

Administrative—Technical—Production
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Process Personnel F-17

WANTED
PAPERBOARD SALESMAN

Age preference 30-45, to work for independently owned paperboard mill, with residence in most desirable city having ideal climatic conditions and opportunity to be home every weekend.

Must have knowledge of all grades folding and setup boxboard; desirable to also have carton experience.

All replies confidential. Address Box 58-38, PAPER TRADE JOURNAL. F-24

WANTED

Machinist, preferably in early forties, to work in one-machine paper mill in Northern Wisconsin. Must have experience in the use of machinist hand tools and machine tools, be able to understand blueprints and written specifications, possess knowledge of shop math, be familiar with working properties of metal, and be able to work with close tolerances. Mill has closed shop and workers are represented by the United Papermakers and Paperworkers, AFL-CIO. Two weeks vacation after five years and three weeks after fifteen years. Group insurance plan and six paid holidays. Reply, giving experience and qualifications to box number 58-46 c/o Paper Trade Journal. F-24

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2—32" Kidder, 4 color Flexographic presses
1—31½" 4-Color Heinrich Flexographic Press.
1—31" two color Wolverine Flexo-Printer
1—30" Kidder 6 station Flexographic press
1—26" 4 color Kidder Flexographic.
1—25" 8-Color Flexographic Press.
1—24" 4-color Kohlbach Flexographic
1—24" 4-Color Kidder Cellopринter

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1—32" 2-color 8 pitch.
1—30" 2-color Dietz 10 Pitch.
1—23" 2-color Windmuller Holscher 10 Pitch.
1—21½" 2-color Hudson Sharp 10 Pitch.
1—16" 2-color Potdevin 8 Pitch.

POWER PAPER CUTTERS

Seybolds: 56" & 64" Precision; 50", 56" & 65"—10Z; 84" Daytos; 60"-20th Century; 65" Holyoke, Sheridan; 36" new model, Oswego: 44", 38", & 34", 54" heavy duty.

CAMACHINES

1—82" Model 10-10A
1—72"—10-04 Shear Cut
1—72" Type 10-10
1—62" 26-2A
1—62" 26-3A.
1—60" 40-1-AF.
1—52", & 1—42", Model 24-7.
2—52" Type 9-S
1—50" 26-3A with C.T. & Elec. Eye
1—42" Type 9-S-A Roller Bearing 1500 fpm.
1—42" Type 10-5A, 30" rewind 1500 fpm.
1—42" Type 24-2A
1—42" Model 10-S
1—30", 1—42", 1—62" Type 6

OTHER SLITTERS

1—40" Model B Fales Shear Cut
2—24", 1—30" & 1—36" Kidder S.L. Shear cut

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1—52" Parry Liner with Reeves Drive.
1—Webendorfer Automatic Collating Machine, Model CS-F.
1—Morpac Packaging Machine. Ser. #1010. Range: L-10"-15", W-7"-10", H-¾"-5".
1—72" & 1—84" Potdevin squeeze roll waxing mach.
1—68" Shartle & Bevis Waxing machine
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1—48" Asphalt Saturating Machine, complete—for Fibreboard, Felt or Kraft Paper.
1—37" & 1—60" Hot Melt Coater & laminator
1—24" & 1—46" Waldron Reverse Coater.
1—Knowlton & 1—Langston Tube Winder with Recutter
1—Oliver Wrapping Machine
1—Morpac Paper Packaging Machine
2—81" Dietz Facial Toilet Tissue Rewinders.
1—48" Hamblet Sheeter with backstands and layboy
4—Hamblet Sheeters, 42", 54", 84" & 100"
1—36" Beck Model CSH Sheeter with Automatic Piler
1—36" Beck Sheeter Model CCSH, suitable for cello.
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1—#81 Potdevin SOS Bag Machine.
1—#104 Potdevin F & S Bag Machine.
4—Roto PO-2 Poly-bag machs.
1—Roto Model C Cellophane Bag machine
1—Matador Bag machine. Length 3½"—10½", Width 1⅜"—6".
1—48" Hudson Sharp Embosser-tinter.
1—48" Unicraft Embosser
2—Waldron Embossers, 1—46", 1—60" heavy duty. F-17

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MAJOR MACHINE BUILDER

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Pulp mill equipment and management experience required.

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2—1500 lb. rag beaters, Valley Iron, bandless rolls, 54" x 48", cast iron tubs.

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1—3 roll 30" face friction Calender Stack (Holyoke), 2 iron rolls, 1 cotton roll and 1 spare cotton roll.
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1—Dilts Classifiner, practically new.

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1—Shartle 8" disintegrator with 125 horsepower induction motor.

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1—Rice-Barton hypoid enclosed drive, 4 to 1 ratio.
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1—28" diameter x 84" face.
2—30" diameter x 40" face, with bearings.
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20—36" diameter x 66" face, complete.
60—36" diameter x 84" face, complete with frames, gears & bearings.
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1—36" diameter x 44" face.
3—36" diameter x 76" face.
6—36" diameter x 80" face.
22—28" diameter x 40" face with frames, gears and felt rolls.
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2—Cooling Drums, bronze, 36" x 128", with frames, gears and necessary rolls to make up the unit. (After dryers)

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50—Brass Felt Rolls, with Brass Journals, 72" face x 5" dia.

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1—Noble & Wood mammoth.
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2—84" Asphalt laminators.

MISCELLANEOUS
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Various cone and assorted pulleys.

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Bird Rotary screen plates.
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1—132" Hamblet heavy duty duplex sheeter, anti-friction bearings throughout, including layboy and backstand.

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1—16" "Swift" Paper Shredder.
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1—32" Cameron Type 9.
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84"—Quick change slitting device shear cut, complete, practically new.

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18—3" Johnson steam joints (new).

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1—Morden Stock Maker.

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1—8 x 18 Shartle Triplex.
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2—150" Stainless steel Suction Boxes.
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1—Downingtown suction couch shell only, 127½" face x 26" diameter.

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1—Beloit, 36" diameter x 246" face, SKF bearings.
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1—9 Roll 56".

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2—72" Hudson-Sharp (Surface type winder).

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1—134" Fourdrinier, 30" wia, suction couch stainless steel headbox with Voith type inlet, 80' wire, 2 presses, 1 suction, 39 dryers, 48" dia., double deck, calender stack, reel, winder and drives.

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THREE IMPCO FLAT SCREENS
Size 12 plate.
Dunbar Type Drive.
One 5 h.p. motor.
Side clean out ports.
Like new condition.
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Paper or Pulp mill light equipment or article to manufacture and distribute.
Well equipped machine shop and bronze foundry would like additional articles for manufacture.
Has nation wide Sales representation in Paper industry.
Prefer Bronze or Stainless Steel items.
Would handle on royalty basis or buy Patents outright. Negotiations after your first reply.
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Paper Trade Journal F-17

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(1) CAMERON SLITTER 10/11 OR MORE MODERN DESIGN, 72" WIDTH, SHEER CUT TYPE PREFERRED.
(2) ONE GUMMING MACHINE, 60" OR WIDER.
(3) ONE KNOWLTON SPIRAL TUBE WINDER, or similar equipment suitable for 7/8" diameter cores and larger.
(4) CORE CUTTER—7/8"
(5) 26" wide FLEXOGRAPHIC PRINTING MACHINE.
(6) ONE ROTARY-X or similar type machine for printing Gummed Tape 3" in width.

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FOUR CYLINDER PAPER MACHINE

Extractor Roll:	24" dia. plain Downingtown with couch.
Vats:	4 Pusey & Jones Goldschmidt type, new 1940, with 4 Warren pumps.
Moulds:	4—48" x 134" with 5 HP gear motors, helper drive each mould.
Couches:	4 Rubber covered about 19" x 136" anti friction.
Primary Presses:	3 sets anti friction, roll r. c. 16 x 136".
1st Press:	Beloit 25" suction press 145" face, top r.c. roll.
2nd Press:	Straight ahead. Top roll 19¾" brass. Bottom roll 18" dia. r.c. Bottom felt 1 37½" x 71 ft.
3rd Press:	Reverse. Top roll 19½" brass. Bottom 18½" R.C. Oscillating doctor.
Dryers:	40—48 x 130" Pusey & Jones double deck, Top and bottom felt, 8—36" felt dryers. Stickles control. Transite hood. 12" dia. spring roll.
Size Press:	Located in dryer section. Top roll anti friction with sheave.
Calenders:	3—126". One nine roll and two seven roll, Box frame. Water cooled bearings. Bottom rolls 22", Tops 18". Intermediates about 12" dia.
Reel:	Revolving two bowl.
Winder:	Langston two drum. 14" dia. drums. Shear cut. Horton clutch. V belt drive.
Drive:	Enclosed type on suction press, balance mortise gear. Prime mover G.E. turbine 450 HP, speed 423, 110 lb. steam pressure. G.E. speed reduction gear 450 HP, 4423—417 rpm.
Screens:	4 Bird #2 and one 8 plate flat screen.
Regulators:	3 Trimbey. Lineshaft 4 7/16".
Last use:	Machine last used as pulp drying. Tonnage 70 tons per day.
Speed:	220 on 120 lb. paper.

We have a Fourdrinier Part with wire 70 ft. x 145", last operated at 800 FPM, which we could substitute for the cylinder wet end.

Frank H. Davis Company, Inc.

Box 231, Cambridge 39, Massachusetts

Telephone—Trowbridge 6-0365

F-17

FOR SALE

PAPERBOARD MACHINE

Six cylinder 79" trim right hand Paperboard Machine. Space required 220 ft. x 35 ft. Speed 50-300 FPM. Production 4500-5000 lbs. per hour. Vats Heresited with flow spreaders. Moulds 48 x 96", couches 18 x 92". all a.f. and new in 1948. Two whippers, extractor roll 24 x 98" with r.c. couch 18 x 98 a.f. and equipped with pneumatic loading. Suction couch 24 x 94" with 15" dia. rubber covered couch roll (new 1956). Two Black & Clawson primary presses 14 x 90", a.f. new 1955; three main presses, rolls 18-20 diameter x about 86" face, all 3 presses equipped with oscillating doctor, new 1955 a.f. Dryer section 1—24 x 84", 38—48 x 86" triple deck heavy Pusey & Jones frame, bronze lined bearings, Johnson joints, new Ross Al. hood; air ducts and Mid West Fulton drainage, new 1955. Two calenders 7 roll, box frame. Curl correction system, reel, duplex cutter and 2 drum winder for 2000 FPM variable drive. Pump vacuum L 70 K 5, stock and water, used with machine. Starch system, spare parts. Moulds, whippers and individual units of machine driven by separate Radicon enclosed motor reducer drive and these in turn by a 200 HP 720 rpm 150 KW 250 Volt D.C. M.G. Set with D.C. control panel, new 1948. Machine now operating and in good operating condition with exception of some surface marks which have shown up on a few dryer heads, owners have agreed to replace these with new heads. Can furnish more details, schematic sketch and pictures upon request.

FRANK H. DAVIS COMPANY INC.

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While we strive for accuracy in preparing the above index which is purely a service to our readers, we cannot be responsible for errors.

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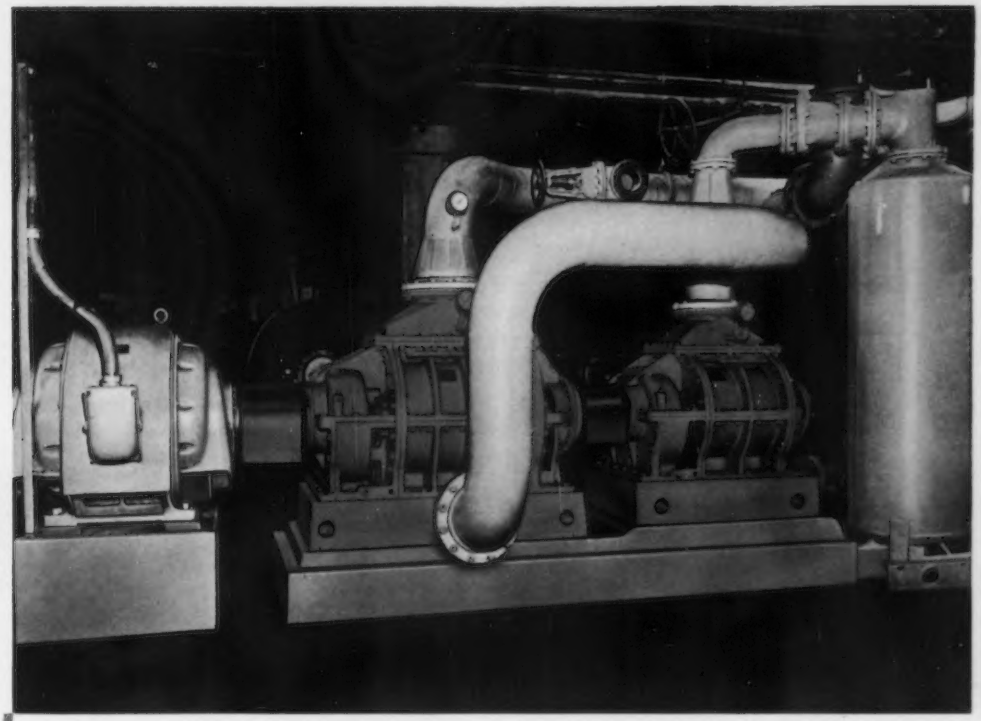

Equipment purchased for this installation Two RCV-2 vacuum pumps—16x35 and 14x24 in compound arrangement, rated 7740 cfm at 22" Hg vacuum, operating at 900 RPM with 294 HP.

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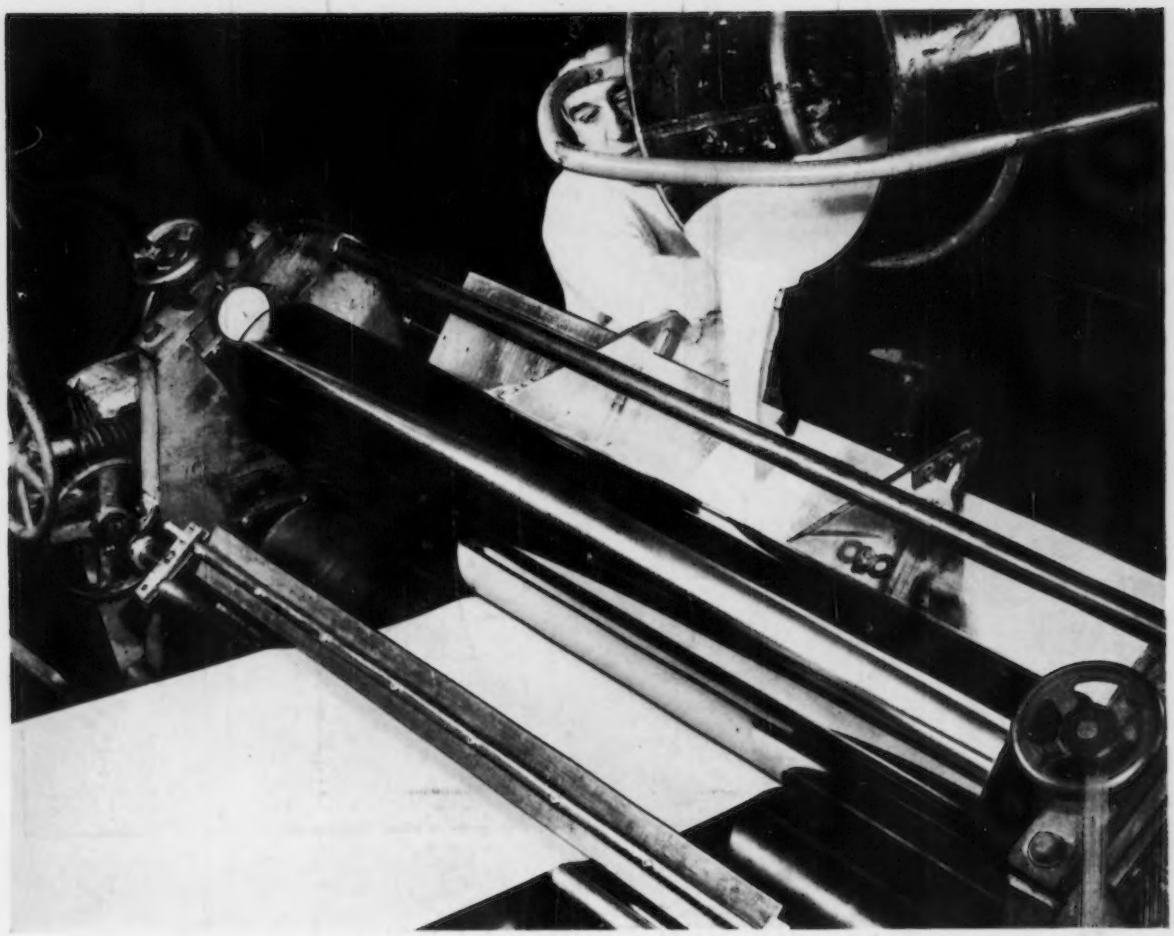

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